restriction for soils as part of the HWIR contaminated media rulemaking process. We believe that EPA's action to include this rulemaking under HWIR will provide consistency in applying RCRA hazardous waste requirements to site cleanups, and will not result in two rules covering the same topic.

NPRA encourages EPA to continue the HWIR rulemaking process for both contaminated media and process wastes. Current land disposal restrictions (LDRs) create strong disincentives for managing wastes at site cleanups and often eliminate many cost effective cleanup options. NPRA supports the effort being discussed in the HWIR roundtable which would allow State management of the remediation process under an approved remedial action plan without being regulated under RCRA Subtitle C hazardous waste and LDR provisions." (National Petroleum Refiners Association, CS2P-00159).

- "<u>BP Oil supports EPA's intention to use the HWIR rulemaking as the vehicle for establishing treatment standards for hazardous soils.</u>

  The Hazardous Waste Identification Rule (HWIR) process is providing opportunity for deliberative development of a hazardous media management program that could offer substantial regulatory reform. The objective of the process is to develop reforms which allow for cost-effective, site-specific remediation practices for contaminated soils and other media which are fully protective of human health and the environment. HWIR rules are now expected to be proposed in January, 1995. Application of land disposal restriction (LDR) requirements to hazardous media prior to completion of the HWIR rulemaking may interfere with adoption of the HWIR reforms. At a minimum, substantial confusion will result for the regulated community if hazardous soil LDRs are implemented and then requirements are revised when the HWIR reforms are completed.

  <u>Applying waste LDR standards to soils is inconsistent with EPA's acknowledgment that there is a distinct difference between appropriate management for contaminated soils and wastes.</u>

  The Agency notes in the March 8, 1994 clarification notice that by deferring the soil LDR requirements to the HWIR rulemaking effort, hazardous soils will be subject to the same LDR standards that apply to the hazardous wastes with which the soils are contaminated. New LDR requirements (the Universal Treatment Standards (UTS)) for wastes with existing LDR standards and LDR requirements for Toxic Characteristic (TC) (D018-D043) wastes and for primary sludge (F037/F038) were proposed on September 14, 1993. EPA plans to promulgate these waste LDR standards by July, 1994. We strongly urge EPA to reconsider application of the waste LDR standards to contaminated soil prior to the anticipated rulemaking. The UTS are based on combustion or incineration which is simply not suitable technology for managing most contaminated soils. EPA notes (55 FR 8760, March 8, 1990) "…because contaminated soil and debris is significantly different from the wastes evaluated in establishing the BDAT standards, it cannot be treated in accordance with these standards…" (BP Oil, CS2P-00163).

- "On March 8, 1994, EPA announced its decision to address contaminated media issues (including those raised in the November 15, 1993 LDR proposal) as part of the Hazardous Waste Identification Rule (HWIR) for contaminated media rather than proceeding with the LDR rule (59 FR 10778). In that notice, EPA stated that "this HWIR rule is intended to replace the existing regulatory system under RCRA, which heretofore has regulated the management of hazardous contaminated media in much the same way that the generated hazardous wastes are regulated." Asarco supports EPA's decision not to finalize the LDR proposal for hazardous soil and believes that the full range of issues related to contaminated media (including but not limited to the "contained-in policy," the definition of hazardous soil, and whether EPA should apply RCRA LDR treatment standards to sites being remediated under other authorities) should be addressed in a coordinated fashion through the HWIR process. This document presents Asarco's comments on the portions of the proposal that relates to hazardous soil, and we hope that the comments will be useful as EPA continues the HWIR process. We intend to submit comments on HWIR proposals when they are released by EPA." (ASARCO, CS2P-00166)

- "API Agrees With EPA that Treatment Standards for Hazardous Soils Should be Addressed in the Hazardous Waste Identification Rule (HWIR)

  API, like EPA, believes that LDR standards for hazardous soils should be considered in the context of a comprehensive regulatory program for the management of hazardous waste contaminated media (including soil and ground water). Therefore, API strongly endorses EPA's decision to re-propose the soil LDR standards in the upcoming HWIR proposal. As EPA acknowledged in the Supplemental Notice, it is difficult to assess the merits of applying the universal standards (or a multiple thereof) to a particular volume of hazardous soils without also considering the suite of other regulatory requirements with which a regulated entity would have to comply as a result of managing the hazardous soil.

  For example, is it appropriate to require a RCRA permit to store the hazardous soil prior to treatment? Is it appropriate to design a waste pile to meet RCRA minimum technology requirements (MTRs) if the unit is only going to be used once – and only for a very <u>limited</u> period of time – to store soil prior to treatment? Does the need to obtain an LDR treatability variance for hard to treat soils unnecessarily complicate and delay the cleanup process?

  These and many other important management considerations are absent from the Phase

II proposal, which only addresses what one must do to the soil before one can dispose of it in a hazardous waste landfill. API believes that soil treatment standards should be made on a site-specific basis taking into consideration at a minimum: (1) the potential for human or environmental exposure to the soils in question, (2) the current and anticipated use of the site, (3) the type and degree of contamination, (4) the geologic and hydrogeologic setting, and (5) the practicability of various site remedy alternatives and their differential costs and human health and environmental benefits. The application of 'cookie cutter' or 'one size fits all' technology-based treatment standards, like those proposed in the Phase II LDR rule for hazardous soil, negates the importance of the criteria mentioned above in addressing differential site circumstances. Thought it may be appropriate to apply Phase II type standards in certain situations, they should not be applied universally to all hazardous waste-contaminated soil. Additionally, the treatment standards in and of themselves will not begin to address – and may contribute to – the already long list of existing disincentives to cleaning up hazardous waste-contaminated media already built into the Subtitle C program (including MTRs, RCRA permitting and LDR soil treatability variances).

It is for the reasons elaborated upon above that API supports the development of a comprehensive hazardous waste contaminated media management scheme, where soil treatment standards would be but one part of that scheme. As EPA is aware, API has been an active participant on the Federal Advisory Committee (Roundtable) making recommendations to EPA on a hazardous waste identification rulemaking (HWIR). A subgroup of the HWIR Roundtable has developed a 'harmonized approach' for the management of high risk and low risk hazardous waste contaminated media that EPA -- with the assistance of select state regulators -- is currently drafting into a proposed rulemaking. API supports the tenets of the 'harmonized approach,' and believes that soil treatment requirements will play a role in that proposal, and consequently sees no need for the Agency to move separately with soil treatment requirements in advance of the HWIR proposal." (API, CS2P-00169)

- "API strongly supports EPA's decision to delay promulgation of soil treatment standards. API agrees with EPA that such standards should be included in a comprehensive contaminated media proposed rulemaking, such as the HWIR proposal. To that end, API plans to continue its efforts of working with EPA to develop the HWIR contaminated media proposal." (API, CS2P-00169)

- "The enclosed AMC comments, however, remain timely and relevant. Before developing LDR requirements for soils at mineral processing facilities, the agency must first establish treatment standards for newly-identified mineral processing wastes. EPA has been correctly and considerably concerned about the technical feasibility of imposing on characteristically hazardous mineral processing wastes the same treatment standards as apply to other characteristically hazardous wastes. There should be an equally strong concern as to whether treatment standards for "hazardous" soil in general would be technically feasible for "hazardous" soil at mineral processing facilities. AMC urges EPA to conduct a single, comprehensive rulemaking addressing all LDR issues, including "hazardous" soil, associated with mineral processing facilities." (American Mining Congress, CS2P-00173)

- "EPA should not impose any LDR requirements on soil at mining and mineral processing facilities until the Agency establishes treatment standards for newly-identified mineral processing wastes and completes the HWIR process." (American Mining Congress, CS2P-00173)

- "II. EPA SHOULD NOT IMPOSE ANY LDR REQUIREMENTS ON SOILS AT MINING AND MINERAL PROCESSING FACILITIES AT THE PRESENT TIME.

  AMC strongly opposes the imposition at this time of LDR treatment standards on soils at mining and mineral processing facilities. As discussed further below, such soils present unique issues that have not been considered by EPA. Moreover, it would be improper to impose LDR requirements on soil contaminated with newly identified mineral processing wastes before the wastes themselves are subject to LDR standards.[1] EPA has rightly expressed considerable concern as to whether it would be technically feasible to impose the treatment standards for characteristic hazardous wastes on characteristic mineral processing wastes. See 56 Fed. Reg. 55160, 55183 (Oct. 24, 1991). The Agency should be equally concerned as to whether the treatment standards being developed for "hazardous" soil in general will be technically feasible for "hazardous" soil at mining and mineral processing facilities.

  In view of the complex issues presented by the potential application of LDR treatment standards to "hazardous" soils at mining and mineral processing facilities, AMC urges EPA to evaluate all LDR issues associated with mining and mineral processing facilities in a single, comprehensive rulemaking, to be conducted after completion of the HWIR process." (American Mining Congress, CS2P-00173)

- "WNG requests EPA to aggressively develop both the LDR and HWIR in a timely manner. This would allow industry to progress with cleanup and would result in a cleaner environment for all." (Williams Natural Gas Company, CS2P-00175) [Also see Chapter 27.A]

- **"**Conoco applauds EPA's decision to merge the soil LDRs with the HWIR proposal. However, in the interim, relief in the form of an OTC deferral for non-UST petroleum

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[1] As noted in AMC's November 15, 1993 comments on the proposed Phase II rule, EPA plans to establish LDR treatment standards for newly identified mineral processing waste as part of its "Phase IV" LDR rule, currently scheduled for promulgation in 1996. See, e.g. 58 Fed. Reg. 57,045 (Oct. 25, 1993).

contaminated media or a nation-wide capacity variance for petroleum contaminated media is necessary.

Conoco welcomes this opportunity to comment on the proposed LDRs and strongly supports EPA's decision with the Hazardous Waste Identification Rule scheduled to be proposed in early 1995." (Conoco, Inc., CS2P-00177)

- "**Conoco understand that EPA has elected to delay the soil portion of the proposed rule and merge the soil LDRs with the Hazardous Waste Identification Rule (HWIR) scheduled to be proposed next year. We strongly support this decision.**

  EPA plans to develop a regulatory scheme based on the HWIR strawman for remediation on contaminated soil. It is logical and efficient that EPA consider the overall regulatory scheme for contaminated media/remediation in determining to what extent LDRs are appropriate.

  Conoco believes that:

  - Technology-based standards are overly restrictive and generally inappropriate for remedial programs. Remedial alternatives must be site-specific and risk-based and as such necessitate flexibility in decision-making.

  - The structure and rigidity of Subtitle C management standards and permitting requirements are not intended nor suitable for remedial actions.

  - The wealth of information available on the fate and effect of petroleum in the environment and the ability of State programs to adequately address releases obviate the need for RCRA Subtitle C standards and LDRs.

  - Ultimately, to foster timely and economical remediation of contaminated media and debris, remediation of these materials must be exempt from RCRA Subtitle C LDRs as well as management standards and permitting requirements." (Conoco, Inc., CS2P-00177)

- "Chevron supports EPA's decision to address land disposal restrictions for hazardous soils and the codification of the "contained in" policy as part of the Hazardous Waste Identification Rule (HWIR) for contaminated media. We strongly endorse this postponement, as we believe the solutions for dealing with contaminated media are very different than those for process wastes." (Chevron, CS2P-00182)

- "DOW SUPPORTS DEFERRAL OF THE CONTAMINATED SOIL RULE TO THE HWIR. RULEMAKING EFFORTS. Dow is actively involved in the HWIR process and has been concerned that the proposed LDR rule for soils could interfere or conflict with the ongoing HWIR dialogue. These two undertakings overlap, with the contaminated HWIR reforms being much more comprehensive and fundamental.

  The HWIR process, if concluded and implemented as intended and directed by Congress, will remove many obstacles to effective, efficient remediation efforts and will repair the badly mangled system for currently generated wastes, both desperately needed reforms.

  Dow supports addressing the issue of soil standards and the contained-in principle in the context of the HWIR dialogues, where a more thorough and integrated reform can be put in place. It is vital that the HWIR effort incorporate the issues involving contaminated soil as well as other media and process wastes. HWIR presents the greatest opportunity for meaningful comprehensive improvements including greater flexibility, lowered barriers to effective remediation and management, and proper oversight of activities." (DOW Chemical Company, CS2P-00184)

- "Unocal wholeheartedly supports EPA in the decision to defer the promulgation of treatment standards for hazardous soils to the Hazardous Waste Identification Rule (HWIR) rulemaking. In our November 15, 1993, comments Unocal advocated not only the coordination of the Phase II LDRs for contaminated soils with HWIR but also the coordination of universal treatment standards (UTSs) for process wastes and treatment residues with HWIR. The deferral provided in the Agency's March 8th clarification is especially appropriate because the HWIR rulemaking and its ability to address the comprehensive management of hazardous soils including treatment standards is, by far, a more apt vehicle for contaminated soils treatments standards than the Phase II LDR proposed rule which is confined to treatment standards before the soil can be disposed of in a hazardous waste landfill." (UNOCAL, CS2P-00185)

- "AISI agrees that issues related to the contained-in rule and the development of alternative treatment standards for hazardous soils are better addressed in the comprehensive HWIR rulemaking and its accompanying federal advisory committee dialogue than in the context of the Phase II LDR proposal. The Contaminated Media Subgroup of the federal advisory committee is engaged in ongoing discussions seeking to develop among various stakeholders a consensus position on treatment standards for soils currently classified as hazardous waste. Moreover, that Subgroup's discussions regarding when contaminated media and debris should be classified as hazardous waste will undoubtedly influence the remaining need for, and the appropriate parameters of, any contained-in rule.

Accordingly, and in light of and in reliance on EPA's March 8, 1984 Federal Register notice, AISI is deferring the submission of comments on the proposed codification of the contained-in principle for soil and media. As EPA is aware, AISI through the participation of its outside counsel, is an industry member of the HWIR Contaminated Media Subgroup. Accordingly, AISI will continue to provide the Agency with its views on issues pertaining to contaminated media (including treatment standards for hazardous soils and the circumstances in which contaminated media should, or should not, be classified as hazardous waste) as part of the HWIR process." (AISI, CS2P-L0002)

- "DuPont support's EPA's intent to address the treatment of hazardous soil and the contained-in policy in the context of the Hazardous Waste Identification Rule (HWIR)." (DuPont, CS2P-L0003)

- "DuPont fully supports EPA's decision to address issues related to the treatment of hazardous soil and the codification of the contained-in policy in the Hazardous Waste Identification Rule (HWIR), rather than through the establishment of soil specific land disposal restrictions (LDRs). HWIR provides a comprehensive framework for addressing the management of contaminated soils and is the more appropriate vehicle for addressing these issues. We look forward to working closely with all of the stakeholders to develop an HWIR approach that brings meaningful reform to RCRA's regulation of contaminated media and remediation wastes" (DuPont, CS2P-L0003)

- "In closing, DuPont fully support EPA's intent to address the treatment of hazardous soils in the context of HWIR, rather than as an LDR rulemaking. We also support the codification of the contained-policy in the same context. We encourage EPA to do so in a way that serves to bring real relief to the remediation process and the full range of remediation wastes, that preserves the greatest amount of flexibility and that encourages the use of innovative remedial technologies to the maximum extent possible. We look forward to working constructively with all stakeholders to achieve these import goals." (DuPont, CS2P-L0003)

Response: All of the comments in the preceding section supported deferral of a decision on LDR treatment standards for contaminated soil to the Agency's Hazardous Waste Identification Rule for Contaminated Media (HWIR-Media) rulemaking process. In consideration of these comments, the Agency did defer a decision on soil treatment standards to the HWIR-Media rulemaking and proposed modified soil treatment standards as part of the HWIR-Media proposal. Comments responding to the soil treatment standards proposed in HWIR-Media are addressed in the HWIR-Media response to comments document, included in the docket for today's rulemaking.

5.B DEFINITIONS

5.B.1 Definition of Hazardous Soil (see Chapter 5)

- "EPA must develop more precise terminology of hazardous soil. Although unintended; concentration values promulgated to identify or evaluate wastes such as 40 CFR 268.48 Table UTS or 40 CFR 261.24 Table 1 (TCLP) are being utilized to evaluate in-situ environmental media. For example, in-situ soils which have met any-use clean-up objectives for a specific site are nevertheless being excavated and disposed (usually incinerated) for exceeding TC levels. Many state regulators can not accept a site condition whereby in-situ soil tests out as 'hazardous' yet meets any-use clean-up standard. The regulators persist in using the TC to determine whether to undertake CERCLA action even after being alerted to the invalidity of this approach in rule making (55 FR 11799; March 29, 1990, Section V.J.1.) RCRA unit closures and corrective actions are similarly being hampered. There is no doubt in my mind that the universal treatment standards as proposed will be utilized inappropriately as cleanup standards.

  Unless more creative terminology is formulated, the term "hazardous soil" must always be qualified as "hazardous soil waste." (Fugro-McClelland (Midwest), Inc., CS2P-0007).

Response: EPA continues to emphasize that the soil treatment standards are not, and should not be used as, de facto cleanup levels. EPA has clarified in today's final rules that the soil treatment standards apply only to placement of contaminated soils that are subject to LDRs.

EPA is not, however, persuaded that a new term is needed to describe contaminated soil subject to the LDRs. EPA believes, at this time, that the definition of soil, promulgated today, and the term, "hazardous soil" in general use as soil that contains a listed hazardous waste or exhibits a characteristic of hazardous waste, are sufficient.

- "HWAC has several other comments regarding various aspects of the EPA's proposal on managing hazardous soils. First, HWAC supports EPA's proposed definition of hazardous soil, which provides that "[s]oil is unconsolidated earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles (sizes as classified by the U.S. Soil Conservation Service), or a mixture of such materials with liquids, sludges, or solids which is inseparable by simple mechanical removal processes and is made up primarily of soil." 58 Fed. Reg. at 48,123. HWAC strongly urges EPA to adopt a definition of soil that allows for the use of simple screening or other relatively cost-effective techniques to determine whether certain materials are 'soils'." (HWAC, CS2P-00020)

Response: EPA appreciates this support of the definition of soil. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today.

The definition of soil promulgated today, like the definition of "hazardous soil" proposed in 1993, relies on simple physical separation processes to remove non-soil from soil.

- "Proposed rule 268.47(a) is confusing in the sense that it states that the universal treatment standards are applicable to RCRA hazardous soil "before the soil is land disposed." This wording raises the issue of how these standards apply "before" disposal occurs. A more appropriate statement would be that hazardous soil may not be land disposed until the treatment standards are achieved or the hazardous soil is excluded as provided in proposed rule 40 CFR 261.4(a)(13). (Boeing, CS2P-00029)

Response: EPA has revised the final regulations to reflect this clarification.

- "The proposed revision to 40 CFR 261.3(g) fails to provide for exclusion of contaminated soil and other media which no longer exhibit a characteristic. Characteristic wastes are subject to 40 CFR 261.3(a)(2)(iii), which provides that a waste which no longer exhibits a characteristic is not regulated except for being subject to the requirements of Part 268. A similar provision should cover environmental media which no longer exhibit a characteristic. Otherwise, storage and treatment permitting requirements may apply and severely restrict the ability of the regulated community to utilize innovative treatment technologies. Further, this latter point is necessary to be consistent with EPA's stated "contained-in" policy. As set forth in 57 Federal Register 986, third column (1/9/92), contaminated media is required to be managed as if it were hazardous waste until it no longer "contains" listed waste, not longer exhibits a characteristic, or is delisted. Thus, the agency's position has been that if media contaminated with a hazardous waste no longer exhibits a characteristic, it does not have to be managed as hazardous. This portion of the policy should be carried forward into codification." (Boeing, CS2P-00029)]

Response: For reasons discussed in detail in the preamble to today's final rule, EPA is not, at this time, taking action to codify the so called, "contained-in" policy. Although the policy is not codified, EPA regions and authorized states may continue to implement the policy, as appropriate, on a site-by-site basis. EPA notes that, under current Agency guidance on implementation of the contained-in policy, it is appropriate to determine that soil which no longer exhibits a characteristic of hazardous waste does not, therefore, contain hazardous waste. Furthermore, if the only means that the soils could be hazardous is if the soil exhibits a characteristic and it does not, then the soil is not subject to subtitle C regulation, with the possible exception of the Part 268 LDR rules. Thus, the same principles would apply as apply to other characteristic and decharacteristed wastes.

- "We support the proposed "pragmatic approach for classifying mixtures of soil and other materials" (see 55 FR 48123). This approach minimizes the handling necessary to manage hazardous soil and other media on-site. Any other approach, such as requiring screening, would be of little benefit and would increase the chances of releases of hazardous constituents to the environment." (Boeing, CS2P-00029)

Response: EPA appreciates this support of the definition of soil. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today.

- "VII. Treatment Standards for Hazardous Soils

    - Definition of Soil and Media

The HWTC does not agree with EPA's definition of soil, and proposes the following change:

> "Soil is unconsolidated earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles (sizes as classified by the U.S. Soil Conservation Service), or a mixture of such materials with liquids, sludges, or solids which is indistinguishable and inseparable by simple physical or chemical means, and is made up primarily of soil."

In addition, EPA must require some form of determination and documentation that the above definition is satisfied, particularly with regard to the "primarily" component of the definition.

The HWTC's objection to the definitional criteria for inseparability being "simple mechanical removal processes" is that the measure for this criteria can consist of a back hoe shovel. Such construction equipment is not capable of providing a distinct separation of excavated containers or sludge from soil. With such a crude yardstick for defining soil, EPA will be promoting further soil contamination by encouraging reckless operation of the back hoe to mix up soil with wastes that is truly non-soil and treatable using process waste BDAT criteria. The mere structure of EPA's proposed definition is an invitation to sue simple mechanical processes to do a poor separation of the soil from the underlying wastes. EPA can come up with a better resolution test than a back hoe.

The definition proposed by the HWTC is still easily implemented in the field, and is also consistent with the definition which EPA used in the debris land disposal restrictions rule. The debris rule defined the type of equipment that could be used to determine separability (see Footnote in Table 268.45 Table 1). These same physical separation devices are frequently used in the field to aid in remediation, and provide a better resolution of soil from other wastes than a back hoe. The same definitional criteria used for debris is justified for soil.

In addition, the definition and criteria for soil must not include free liquid, and a free liquid test must be performed and documented to support the claim that the material is soil. Again, EPA should use the same criteria promulgated and accepted for the definition of contaminated debris. The results of the free liquid test must be documented to support the conclusions reached.

In addition, the government party providing oversight must be required to maintain documentation any determinations that a mixture of soil and other materials was properly classified as soil. EPA must not allow any determinations that are not documented and recorded for later inspection." (Hazardous Waste Treatment Council, CS2P-00060)

Response: EPA continues to believe that decisions about whether any given volume of material is "soil," "debris," or "waste" should be made by judging the results of simple in-situ mechanical removal processes such as pumping, dredging, or excavation by backhoe. As discussed in the April 29, 1996 and September 14, 1993 proposals, attempting to distinguish more precisely between waste, soil or debris using chemical analysis or other tests would be prohibitively difficult to develop and support and cumbersome to administer. The Agency adopted a similar system for classification of hazardous debris in 1992 and is not aware of undue implementation difficulties or willful mis-identification of debris by remedial project managers.

In fact, the test under the debris rule requires only a visual inspection (see 268.2 (g)), and so is actually slightly more lenient. (The commenter is mistaken in its reference to a requirement of separation by certain technologies mentioned in n.9 of Table 1 to 268.45. This note indicates that certain means of removal of debris contamination must be undertaken as part of the debris treatment process. It does not define what debris is.) Furthermore, EPA does not accept the commenter's point that the definition creates incentives to mix soil with other wastes to try and create a more lenient treatment requirement. Among other things, as the Agency indicated with respect to debris as well, deliberate mixing is impermissible dilution (since it would be a substitute for adequate treatment) and the mixture would remain subject to the strictest standard for the waste part of the mixture pursuant to 268.40 (c). The dilution prohibition is found at 268.3; the preamble discussion on the analogous issue in the debris rule is at 57 FR at 37224/3.

In addition, the Agency proposed the same definition, as a definition of "soil," in the April 29, 1996 proposal and did not receive this type of adverse comment. Thus, it is not clear that the issue is preserved. The Agency's substantive response to these issues should not be read as conceding that the issue is preserved for purposes of review.

- "The rule proposes that all soils containing listed wastes or soils exhibiting a hazardous characteristic would be subject to UTSs. Considering the fact that the proposed definition of hazardous soil could conceivably include soils exhibiting a characteristic as a result of naturally occurring materials in the soil, the definition is ambiguous. The Agency should account for and make allowances for naturally occurring background levels of naturally occurring constituents in soil. EPA should clearly state that the rule does not affect soils contaminated by wastes for which LDRs have not been established prior to the effective date of the proposed rule.

  With regards to constituents in characteristic waste, AWPI urges EPA to consider using the same logic followed in promulgating the land disposal restrictions for hazardous debris. 57 FR 37194 and 37236. In developing those regulations, EPA acknowledged that almost no debris could be ignitable since ignitable wastes must be a liquid. EPA further acknowledged that debris could not be corrosive since only liquids can be corrosive. The same logic applies to soil. Further, it is very unlikely that soil could ever be reactive. In regards to soils exhibiting the toxicity characteristic, EPA should focus on constituents in the soil at levels exceeding the TCLP after accounting and making adjustments for naturally occurring background levels as discussed above." (AWPI, CS2P-00047**)**

Response: Regarding naturally occurring background constituents, the Agency has clarified that treatment to comply with the soil treatment standards will not be required if constituent concentrations fall below naturally occurring background concentrations, provided the soil will continue to be managed on site or in an area with similar natural background concentrations. If soil will be sent for land disposal off-site, compliance with the alternative soil treatment standards is required, since the Agency believes that natural background concentrations on-site will not automatically correspond to natural background concentrations at a remote land disposal facility. The issue of which hazardous constituents in TC soils must be treated is discussed in other responses and in the preamble to the final rule..

Regarding the ignitible and reactive characteristics, the Agency agrees the soil will seldom, if ever, exhibit these characteristics; however, if it should occur, the Agency continues to believe that elimination of the ignitible or reactive characteristic should be required as part of LDR treatment.

- "The proposed definition for soil will pose severe implementation problems and cause cost increases when applied to remediation sites. On page 58 FR 48123 of the preamble, the U.S. EPA proposes to define the term "soil" so that it would only include those "liquids, sludges, or solids which are inseparable by simple mechanical removal processes"." (ASTSWMO, CS2P-00091)

Response: EPA does not believe that the definition of soil will pose severe implementation problems. The Agency adopted a similar approach in the definition of "debris" and is not aware of implementation difficulties. (See response to ETC comment above.) In addition, the Agency proposed the same definition, as a definition of "soil," in the April 29, 1996 proposal and did not receive this type of adverse comment. Thus, it is not clear that the issue is preserved. The Agency's substantive response to these issues should not be read as conceding that the issue is preserved for purposes of review.

- "**Definition of "Hazardous Soil" (page 48123):** GM agrees with the proposed definition of "hazardous soil" (i.e., contains listed hazardous waste(s) or exhibits one or more hazardous characteristics). We further agree that the term "hazardous soil" is far more definitive than the previous term " contaminated soil"." (General Motors, CS2P-00095)

Response: EPA appreciates this support of the definition of soil. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today.

- "**Definition of Hazardous Soil**

  For the first time, USEPA proposes to codify its contained-in policy and in so doing includes a proposed definition of hazardous soil as well as proposed treatment standards for such hazardous soil. In subpart 268 (the LDR regulations), hazardous soil is defined as "soil that contains RCRA hazardous wastes listed in 40 CFR part 261, subpart D, or that exhibits one or more of the characteristics of hazardous waste as defined in 40 CFR part 261, subpart C." Proposed 40 CFR 268.2. USEPA then proposes treatment standards for "hazardous soil", 40 CFR 268.47. We conclude from these two provisions that soil which does not contain a listed hazardous waste and does not exhibit a characteristic has no land disposal restriction. Thus, for example, soil contaminated with a spill of material from an in-process pipe (which material in the pipe theoretically could originally meet the ignitability characteristic if discarded) is not subject to land disposal restrictions if the soil, that has received the spill, itself is not characteristically hazardous, regardless of any point of generation issues regarding the spilled process material.

  Hoechst Celanese agrees with this approach since soils that do not meet the hazardous waste characteristics should not be subject to LDRs. However, we also believe that this definition should not be limited to the LDR section of the regulations. By defining this material as “hazardous soil” as opposed to “restricted soil”, we believe the Agency intended to define when soils will be considered hazardous wastes. Therefore we believe the definition of hazardous soils should be moved to part 261 (the definition of hazardous wastes) to clarify that such soils not only have no LDRs but in fact are not hazardous wastes, even though they may contain in-process material that might have met a hazardous waste characteristic. Such a result is clearly anticipated by the proposed rule for “contained-in determinations” which provides a mechanism whereby environmental media that is contaminated with listed wastes or is characteristically hazardous will be declared no longer subject to the hazardous waste regulations. See proposed 40 CFR 261.3(g). This provision provides no determination mechanism for soils (and other environmental media) that do not meet the hazardous waste characteristics but that have been contaminated with previously characteristic material. This makes sense since such soils have no LDRs, as discussed above, and should not be considered hazardous wastes.

Moreover, we believe the same interpretation should apply to listed hazardous wastes that are listed for ignitability, or corrosivity only. Such materials, when spilled on soil, should not be hazardous wastes nor should they be land disposal restricted as long as the soil does not exhibit the hazardous waste characteristic. The listed ignitable (or corrosive or reactive) constituents other than the constituent that lead to the listing for ignitability or corrosivity or reactivity since in order to be a listed waste it must be a commercial chemical product with the listed chemical as its sole active ingredient. Therefore, once the listing characteristic is lost when the listed material spilled to the soil, the soil should be excluded from the hazardous waste regulations and from the LDRs.

Therefore, we suggest that the definition for hazardous soil be moved to Part 261 and that the definition clearly exclude soil that has received in process wastes or wastes that are listed solely for ignitability, corrosivity or reactivity, but which does not exhibit any hazardous waste characteristic.” (Hoechst Celanese Corp., CS2P-00123)

Response: EPA is not, at this time, taking action to promulgate a definition of “hazardous soil.” EPA is promulgating a definition of “soil,” consistent with the definition of soil discussed in the LDR Phase 2 proposal. Consistent with this commenter’s recommendation, EPA will promulgate the definition of “soil” in 40 CFR 261.

EPA notes that the term “hazardous soil” continues to mean soil that contains a listed hazardous waste or exhibits a characteristic of hazardous waste. The Agency is not, at this time, taking action to codify the so called “contained-in” policy, however, the policy continues to apply to determinations of whether any given environmental media contains hazardous waste and therefore requirements management under RCRA Subtitle C. The so called “contained-in" policy is discussed in detail in the preamble to today's final rule. Under EPA's current guidance on implementation of the contained-in policy, for soil contaminated by spills of characteristic hazardous waste, it is appropriate to determine that soil does not contain hazardous waste when the soil does not exhibit a characteristic of hazardous waste. EPA believes this determination would also be appropriate for soil contaminated by hazardous wastes listed Soly because they exhibit a characteristic of ignitability, corrosivity or reactivity.

- "EPA proposes to define "hazardous soil" as soil that <u>contains</u> a listed waste or that <u>exhibits</u> a characteristic of hazardous waste (268.2(f). This is consistent with the approach previously promulgated for debris and is appropriate and practical.

  However, proposed 268.39(a) prohibits "soils that are <u>contaminated</u> with D012-D017 ...". The language should properly read "soils that exhibit D012 - D017 ...".

  Similarly, proposed 268.39(b) prohibits debris that are <u>contaminated</u> with D018-D043. It should read "debris that <u>exhibit</u> D018-1043 ...".

  This subtlety has a significant impact on remediation.

  > Example: At one Union Carbide location, three construction projects during the last year generated soil which did not exhibit the Toxicity Characteristic and were not subject to land disposal restrictions. These were routine construction projects which generate soil from foundation and utility excavations. However the materials spilled on the soil, decades ago, would have exhibited the toxicity characteristic before they were spilled. The approach taken is proposed 268.39(a) would appear to apply the TC land disposal restrictions to the soil. The total soil involved was 53 cubic yards at this location.

  As a general rule, we would expect on the order of 100 yards of soil generated from routine construction projects at Union Carbide locations to be in this category; namely, the soil does not exhibit the toxicity characteristic, but contains constituents from products or wastes which exhibited the Toxicity Characteristic at the time they were spilled. And even greater amounts (as yet undetermined) are expected to be generated by remediation activities.

  We note that the dilution prohibition at 268.3 prevents the mixing of restricted waste with soil to circumvent land ban treatment. Thus, one could not mix prohibited TC waste with soil to circumvent the land ban treatment of the TC waste." (Union Carbide Corporation, CS2P-00142)

Response: EPA is not, at this time, taking action to promulgate a definition of "hazardous soil." EPA is promulgating a definition of "soil," consistent with the definition of soil discussed in the LDR Phase 2 proposal.

EPA notes that the term "hazardous soil" when used by the Agency continues to mean soil that contains a listed hazardous waste or exhibits a characteristic of hazardous waste. The so called "contained-in" policy is discussed in detail in the preamble to today's final rule. Also discussed in detail in the preamble is the application of LDRs to contaminated soil. In the case of the contamination discussed in the commenter's example above, provided the soil was contaminated prior to the effective date of any applicable LDRs, the soil would only be subject to LDRs if it was determined, at its point of generation, to contain listed hazardous waste or exhibit a characteristic of hazardous waste. Under EPA's current guidance on implementation of the contained-in policy, for soil contaminated by spills of characteristic hazardous waste, it is appropriate to determine that soil does not contain hazardous waste when the soil does not exhibit a characteristic of hazardous waste.

- "On page 48123, EPA has proposed to define soil as the unconsolidated earth material composing the superficial geologic strata, or a mixture of such materials with liquids, sludges, or solids which are inseparable by simple mechanical removal processes and are made up primarily of soil. EPA has stated that this proposed definition would allow site managers to determine whether the material to be excavated is waste, debris, or soil by judging the results of simple in-situ mechanical removal processes to separate the materials. Such processes include pumping, dredging, or excavation by backhoe, forklifts, or other devices.

  A commenter from the TNRCC closure team is concerned that an on-site coordinator may have an economic incentive to classify as much material as possible as being hazardous soil rather than waste, so that the treatment can be done to (less expensive) higher concentration levels. The commenter recommends that EPA should require documentation and certification of the small-scale analytical and field methods used for separation of waste and soil." (Texas Natural Resource Conservation Commission, CS2P-00145)

Response: EPA continues to believe that decisions about whether any given volume of material is "soil," "debris," or "waste" should be made by judging the results of simple in-situ mechanical removal processes such as pumping, dredging, or excavation by hackhoe. As discussed in the April 29, 1996 and September 14, 1993 proposals, attempting to distinguish more precisely between waste, sail or debris using chemical analysis or other tests would be prohibitively difficult to develop and support and cumbersome to administer. The Agency adopted a similar system for classification of hazardous debris in 1992 (actually requiring only visual inspection) and is not aware of undue implementation difficulties or willful mis-identification of debris by remedial project managers.

The Agency notes that it proposed the same definition of soil in the 1996 HWIR-Media proposal and did not receive this type of adverse comment. In fact, in their comments on the 1996 proposal, states generally, including the state of Texas, strongly recommended that EPA categorically exempt any remediation waste, including contaminated soil, from all RCRA Subtitle C hazardous waste management requirements, if the waste was managed as part of a state overseen remedial action.

- "EPA must clarify the definition of hazardous soil and its contained-in policy to ensure that soils not containing Subtitle C waste (including soils with naturally occurring metals and soils that are Bevill wastes or contain Bevill wastes) are in no case deemed hazardous waste." (ASARCO, CS2P-00166)

Response: EPA is not, at this time, taking action to finalize either the definition of "hazardous soil" or the so called "contained-in" policy. The preamble to today's final rule has a detailed discussion of when LDRs apply to contaminated soil and of the contained-in policy, which, at this time, the Agency believes will provide adequate guidance for program implementation.

Regarding soil contaminated with Bevill waste, however, since the Bevill wastes themselves are not subject to subtitle C regulation they also are not subject to LDR requirements. See Horsehead Development Resource Co. V. EPA in 16 F.3d which held that even if prohibited wastes are combined with Bevill wastes in a way that allows the wastes to retain Bevill status, LDR requirements do not apply.

Regarding naturally occurring metals, the Agency has clarified that treatment to comply with the soil treatment standards will not be required if constituent concentrations fall below naturally occurring background concentrations, provided the soil will continue to be managed on site or in an area with similar natural background concentrations. If soil will be sent for land disposal off-site, compliance with the alternative soil treatment standards is required, since the Agency believes that natural background concentrations on-site will not automatically correspond to natural background concentrations at a remote land disposal facility.

■ "DEFINITION OF HAZARDOUS SOIL

EPA proposes to define as "unconsolidated earth material composing the superficial geologic strata (material overlying bedrock), consisting of clay, silt, sand, or gravel size particles... or a mixture of such materials with liquids, sludges, or solids which is inseparable by simple mechanical removal processes and is made up primarily of soil." In its September 14, 1993 proposal, EPA defines hazardous soil as soil that contains or is mixed with a listed RCRA hazardous waste or that exhibits a hazardous waste characteristic. Under this proposal, the Regional Administrator could make a"contained-in" determination that soil or other hazardous media are no longer contaminated with hazardous waste.

The definition of hazardous soil and the contained-in policy are critical because EPA's decision on these matters will determine what materials enter the RCRA hazardous waste system in the first place. In formulating the hazardous soil definition and contained-in policy. EPA needs to consider issues specific to mining and mineral processing wastes. Asarco supports AMC's detailed comments (filed today under separate cover) on the definition of hazardous soil. Several key concerns are discussed briefly hereinafter.

A. Naturally Occurring Soils

Soils at mining and mineral processing facilities (and at other sites as well) often contain naturally high level of metals. Under EPA's September 14, 1993 proposal, any naturally occurring soil that happened to fail the TCLP test could potentially be considered hazardous waste by EPA, even if no contamination had ever occurred. EPA's definition of hazardous soil is overly broad and conceivably could be interpreted to include earthen materials that may contain naturally occurring or "background" levels of metals. EPA should state in its definitions that earthen materials not contaminated with hazardous waste will in no case be considered hazardous waste.

One subset of naturally occurring earthen materials is ones and minerals that are raw materials for extraction, beneficiation, and processing. EPA should state that these materials will in no case be considered hazardous waste because, in addition to being uncontaminated by any waste, they are raw materials - not wastes.

B. Soils That Contain Bevill Wastes

Within the overall principle that earthen material not contaminated with hazardous waste should not be considered hazardous waste, EPA should clarify that soils containing Bevill wastes are in no case considered hazardous wastes, because the Bevill wastes themselves are not regulated under RCRA Subtitle C. EPA has determined that Bevill wastes from mining and mineral processing do not warrant Subtitle C regulation (51 FR 24496, July 3, 1986 and 56 FR 27300, June 13, 1991). Therefore, earthen material containing or mixed with Bevill wastes should not be regulated under Subtitle C.

C. Soils That Contain "De-Bevilled" Wastes

EPA has not yet proposed LDRs for newly identified "de-Bevilled" mineral processing wastes. Therefore, EPA should not yet impose LDRs on soils containing these wastes. The newly identified mineral processing wastes comprise those wastes excluded by EPA from Bevill Amendment coverage. In September 1989, EPA determined that certain mineral processing wastes removed from the scope of the Bevill Amendment, if hazardous, are "newly identified for the purpose of [the LDR program]." As EPA pointed out in the LDR Third final rule, newly identified mineral processing wastes should not be subject to treatment standards until there is adequate technical information developed to support an appropriate treatment standard, EPA noted that "the mineral processing wastes are sufficiently different from other characteristic wastes to warrant additional analysis."

EPA must, through independent analysis of the characteristic of the mineral processing wastes, develop separate standards for newly identified mineral processing wastes in the "Phase IV" rule in 1996. EPA must not apply LDRs to soils containing mineral processing wastes before it has determined LDRs for mineral processing wastes themselves.

D. Use of the Toxicity Characteristic Leaching Procedure for Mining and Mineral Processing Wastes

The D.C. Circuit has remanded the Toxicity Characteristic Leaching Procedure (TCLP) with respect to non-Bevill mining and mineral processing wastes because the Agency has not justified adequately the application of that procedure to mining and mineral processing wastes. (See Edison Electric Institute v. EPA, Cir. No. 89-1320, D.C. Circuit, August 6, 1993.) The court's decision in Edison calls into question the applicability of Subtitle C requirements for soils containing mining and mineral processing wastes when the soils fail the TCLP. Furthermore, the decision raises questions regarding whether LDRs that depend on the TCLP could be applied to mining and mineral processing wastes. EPA must address these specific issues and consider the court's opinion in Edison in any decisions related to the definition of hazardous soil and/or applicability of LDR treatment standards to mineral processing wastes and soils containing mineral processing wastes." (ASARCO, CS2P-00166)

Response: EPA is not, at this time, going forward with the portions of the LDR Phase 2 or HWIR-Media proposals which would have codified the so called "contained-in" policy. EPA is also not, at this time, promulgating a definition of "hazardous soil."

The "contained-in" policy is discussed in detail in the preamble to today's final rule. Under current Agency guidance on implementation of the contained-in policy, soil determined to contain so called "de-Bevilled" waste would be subject to regulation under RCRA Subtitle C. Soil contaminated by exempt Bevill wastes would, of course, also be exempt. Furthermore, EPA believes that it may be appropriate to determine that soil containing hazardous constituents at or below natural background concentrations should properly does not contain any solid or hazardous waste, and thus would not be subject to regulation as waste under RCRA. EPA notes that natural background concentrations are concentrations present in areas that have not be affected by releases or other human activities.

Regarding application of the TCLP to mining and mineral processing wastes, the Agency has determined to do so for reasons set out in the preamble to the final rule and in other responses to comment. Finally, the commenter's point regarding applicability of LDRs to deBevilled wastes is answered by the other parts of the Phase 4 rule which do prohibit such wastes from land disposal, and which apply as well to media contaminated with such wastes**.**

- "The LDEQ agrees with the proposed definition of soil. It will simplify the process of determining whether the material is a soil, waste, or debris. This definition will also speed up the remediation of a contaminated site. A mechanism will be needed to certify that the material is a soil. This can either be a certification from onsite personnel or from a visual inspection by an independent laboratory. A certification from an independent laboratory would be preferred." (Louisiana DEQ, CS2P-00167)

Response: EPA appreciates this support of the definition of soil. The definition discussed in the 1993 LDR Phase 2 proposal was re-proposed in the 1996 HWIR-Media proposal and is being promulgated today.

The Agency does not, at this time, agree that certification of whether or not a material is soil should be required. The Agency believes this would present an administrative burden not warranted by the determination at hand. Agency overseers, experts, and field personnel routinely make decisions about whether any given material is "waste," "soil," or "debris." The Agency adopted a similar system for classification of hazardous debris in 1992 and is not aware of undue implementation difficulties or willful mis-identification of debris by remedial project managers.

- "Hazardous Soil: API prefers the use of the term 'remediation waste,' as defined in the corrective action management unit (CAMU) rule (58 FR 8683) as opposed to the proposed term 'hazardous soil.' The term 'remediation waste' more accurately recognizes the mixture of materials likely to be encountered in a remedial setting, and acknowledges the often blurred distinction between wastes and contaminated soils. However, if EPA chooses to use the term 'hazardous soil,' API believes that the phrase '...or a mixture of such materials with liquids, sludges or solids which is inseparable by simple mechanical removal processes and is made up of primarily of soil...' is particularly critical to the definition. This phrase recognizes: (1) the practical difficulty of separating waste-like material form the soil matrix, and (2) that expensive and time-consuming chemical or physical/chemical methods of separating waste from soils should not be required before the materials can be managed as a 'hazardous soil.'" (API, CS2P-00169)

Response: EPA appreciates this support of the definition of soil. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today. EPA notes that contaminated soil remains a component of the more-encompassing definition of "remediation waste."

- "Before EPA turns its attention to LDR treatment standards for soils at mineral processing facilities, the agency must first narrow its over-inclusive definition of "hazardous soil." Two major components must be addressed. First, the proposed definition must be modified so that it does not include naturally-occurring soils at mineral processing facilities. Second, the proposed definition must be amended so that it does not cover soil contaminated with Bevill wastes. As it now stands, the proposed definition will simply prove unworkable, at best. The enclosed comments set forth the underlying rationale for the needed modifications." (American Mining Congress, CS2P-00173)

Response: EPA is not, at this time, taking action to finalize either the definition of "hazardous soil" or the so called "contained-in" policy. The preamble to today's final rule has a detailed discussion of when LDRs apply to contaminated soil and of the contained-in policy, which, at this time, the Agency believes will provide adequate guidance for program implementation.

The "contained-in" policy is discussed in detail in the preamble to today's final rule. Under current Agency guidance on implementation of the contained-in policy, soil determined to contain so called "de-Bevilled" waste would be subject to regulation under RCRA Subtitle C. Soil contaminated by exempt Bevill wastes would, of course, also be exempt. Furthermore, EPA believes that it may be appropriate to determine that soil containing hazardous constituents at or below natural background concentrations should properly does not contain any solid or hazardous waste, and thus would not be subject to regulation as waste under RCRA. EPA notes that natural background concentrations are concentrations present in areas that have not be affected by releases or other human activities.

- "EPA must modify its proposed definition of hazardous soil that it does not encompass any of the following materials: (1) soil that exhibits a characteristic solely because it contains high "background" concentrations of metals or other hazardous constituents (i.e., "uncontaminated" soil); (2) uncontaminated "soil" used as raw material in mining and mineral processing operations; (3) soils that are Bevill wastes; (4) soil contaminated solely with Bevill wastes; (5) soil contaminated with both Bevill wastes and non-Bevill mineral processing wastes: and (6) soil containing insignificant amounts of non-Bevill mineral processing wastes." (American Mining Congress, CS2P-00173)

Response: EPA is not, at this time, taking action to finalize either the definition of "hazardous soil" or the so called "contained-in" policy. The preamble to today's final rule has a detailed discussion of when LDRs apply to contaminated soil and of the contained-in policy, which, at this time, the Agency believes will provide adequate guidance for program implementation.

The "contained-in" policy is discussed in detail in the preamble to today's final rule. Under current Agency guidance on implementation of the contained-in policy, soil determined to contain so called "de-Bevilled" waste would be subject to regulation under RCRA Subtitle C (this would include soil contaminated by both "de-Bevilled" and Bevill wastes; otherwise, Bevill wastes would be used to immunize non-Bevill wastes from subtitle C requirements, a result EPA believes contrary to both law and policy). Soil contaminated solely by exempt Bevill wastes would, of course, also be exempt. Furthermore, EPA believes that it may be appropriate to determine that soil containing hazardous constituents at or below natural background concentrations should properly does not contain any solid or hazardous waste, and thus would not be subject to regulation as waste under RCRA. EPA notes that natural background concentrations are concentrations present in areas that have not be affected by releases or other human activities

■ "III. BEFORE EPA IMPOSES LDR TREATMENT STANDARDS ON SOILS AT MINING AND MINERAL PROCESSING FACILITIES, IT MUST FIRST MODIFY ITS OVER-INCLUSIVE DEFINITION OF "HAZARDOUS SOIL"

EPA proposes to establish a definition of "soil" for purposes of the LDR program that would encompass "unconsolidated earth material composing the superficial geologic strata . . . consisting of clay, silt, sand, or gravel size particulate . . . . or a mixture of such materials with liquids, sludges, or solids which is inseparable by simple mechanical removal processes and is made up primarily of soil." 58 Fed. Reg. At 48,123. EPA's proposed definition of "hazardous soil" could presumably include certain soils at mining and mineral processing facilities that are not properly subject to regulation as hazardous wastes under the Resource Conservation and Recovery Act ("RCRA").

The potential over broad application of the proposed definition of hazardous soil to materials at mining and mineral processing facilities raises serious problems. In particular, AMC is concerned that the proposal could be interpreted unlawfully to encompass soils that exhibit a characteristic solely because they are naturally high in metals concentration, as well as soil that contains Bevill wastes only. AMC is also concerned about the potential regulation of soil contaminated by such small amounts of non-Bevill mineral processing wastes as to not be significantly affected by such waste, and the consequences of regulating soil that contains non-Bevill mineral processing wastes before those wastes themselves are regulated under the LDR program.

In order to avoid these untoward results, EPA must recognize explicitly in the final rule that it cannot at any time regulate under the LDR program: (1) soil that exhibits a characteristic solely because it contains high "background" concentrations of metals or other hazardous constituents (i.e., "uncontaminated" soil); (2) uncontaminated "soil" used as raw material in mining and mineral processing operations; (3) soils that are Bevill wastes; (4) soil contaminated solely with Bevill wastes; (5) soil contaminated solely with Bevill wastes and non-Bevill mineral processing wastes; and (6) soil containing insignificant amounts on non-Bevill mineral processing wastes.

A. The Proposed Definition of Hazardous Soil Must Be Modified so that It Does Not Cover Soils that Contain Naturally High Concentrations of Metals or Other Hazardous Constituents

One of AMC's chief concerns regarding the proposed definition of hazardous soil is that it might be interpreted to encompass uncontaminated soil that contains naturally high concentrations of metals or other hazardous constituents. For example, the proposed definitions might be interpreted by some to cover the ores and minerals that are the raw materials for extraction, beneficiation, and processing operations; overburden and other wastes from the extraction of ores and minerals; and earthen materials that are excavated and/or moved for purposes of construction or restoration of mining sites. As discussed below, EPA lacks authority to regulate any of these materials under the LDR program.

1. Even if "Hazardous," Uncontaminated Soils Cannot Be Regulated Under Subtitle C Because They Are Not "Solid Wastes"

The proposed definition of "hazardous soil" could unlawfully sweep into the hazardous waste regulatory system certain soils that are not contaminated and therefore are not properly within the jurisdiction of Subtitle C. The term "contaminate" means to render unfit for use by the introduction of unwholesome or undesirable elements." Webster's Third New International Dictionary (1981), p. 491. It is beyond question that soils at mining and mineral processing facilities frequently contain high concentrations of metallic constituents, not because of the "introduction" of foreign matter into such soils, but because the soils contain naturally high concentrations of metals.

Moreover, to the extent that soils may be used as raw material for mining and mineral processing operations, the metallic constituents in such soils are not "undesirable elements." Instead of rendering the soil "unfit for use," the metallic constituents actually enhance the usefulness of soils in the metals production process. Clearly, the mere fact that soil located at a mining or mineral processing facility exhibits a characteristic of hazardous waste does not mean that the soil is "contaminated."

To the extent that soil is not contaminated, it is beyond the scope of Subtitle C jurisdiction. It is well-established that soil is not a solid waste. See, e.g., Chemical Waste Management v. EPA, 869 F. 2d 1526, 1538 n.14 (D.C. Cir. 1989). Subtitle C is unquestionably limited to the regulation of solid wastes. American Mining Congress v. EPA, 824 F.2d 1177, 1179 (D.C. Cir. 1987). Thus, if soil naturally exhibits a characteristic of hazardous waste, it cannot be regulated under any aspect of Subtitle C, including the LDR program.

2. Certain Soils at Integrated Mining and Mineral Processing Operations are Raw Materials and Thus Outside the Scope of EPA's Subtitle C Jurisdiction

The regulation of uncontaminated soils is particularly inappropriate at "integrated" mining and mineral processing facilities.[2] "Earth material," which is included in the proposed definition of soil, may encompass the ores and minerals which are used by integrated facilities as raw materials in the production of metals and other valuable commodities. When used in this manner, "soils" clearly are not "discarded" and therefore cannot be considered solid or hazardous wastes subject to Subtitle C jurisdiction.

Moreover, any attempt to regulate these raw materials under Subtitle C would run afoul of clear congressional intent that RCRA not be used to interfere with the production decisions of industrial facilities. See S. Rep. No. 988, 94th Cong., 2d Sess. 26, reprinted in 1976 U.S. Code Cong. & Admin. News 6238, 6264 (RCRA "does not establish any federal regulatory authority with respect to decisions in the manufacturing process."); S. Rep. No. 284, 98th Cong., 1st Sess. 6 (1983) ("the [1984] amendments do not authorize the EPA . . . to intrude into the production-process or production decisions of individual generators."). Thus, EPA lacks authority to regulate under the LDR program uncontaminated "soils" that serve as raw materials for mining and mineral processing operations.

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[2] As used throughout these comments, the term "integrated" facility refers to facilities at which mineral processing operations are co-located with mining (i.e., extraction and beneficiation) operations.

3. Certain Naturally-Characteristic Soils are Bevill Wastes that are Excluded from Regulation Under Subtitle C

The regulation of naturally-characteristic "earthen material" at mining and mineral processing facilities would also violate the express language of the Bevill Amendment, which excludes solid wastes from the extraction, beneficiation, and processing of ores and minerals from regulation under Subtitle C, including the Subtitle C LDR program. 42 U.S.C. § 6921 (b)(3)(A)(ii). Certain metal-containing materials, such as overburden and waste rock from ore and mineral extraction operations, are clearly covered by the Bevill Amendment, and have been determined by EPA not to warrant regulation as hazardous wastes under RCRA Subtitle C. Id. See also generally 51 Fed. Reg. 24,496 (July 3, 1986). As a result, they cannot be regulated under the LDR program. See Horsehead Resource Development Co., Inc. v. EPA, No. 91-1221 and consolidated cases (D.C. Cir. Slip op. Feb. 22, 1994) at 30 n.9 ("Bevill wastes which are not Subtitle C hazardous wastes remain [] exempt from the LDR.").

Nevertheless, EPA's over broad definition of hazardous soil could conceivably be interpreted by some parties to encompass these materials, thereby potentially causing them to be subject to the Agency's LDR regulations. Such a result is clearly contrary to the Bevill Amendment. Thus, EPA must modify the definition of hazardous soil to exclude "earthen materials" at mining and mineral processing facilities to the extent that they are Bevill wastes.

B. EPA's Proposed Definition of Hazardous Soil Must Be Modified do that It Does Not Cover Soil Contaminated with Bevill Wastes

AMC is concerned that EPA's proposed definition of hazardous soil will encompass not only certain naturally-characteristic soils, but also soils contaminated with Bevill wastes. This issue may arise in a number of different contexts, including: (1) soils contaminated with both Bevill wastes only; and (2) soil contaminated with both Bevill wastes and non-Bevill wastes (such as mineral processing wastes that have been removed from the scope of the Bevill Amendment).[3] Each situation is considered separately below.

1. Soil Contaminated with Bevill Wastes Only

Soils contaminated with Bevill wastes only clearly cannot be subject to Subtitle C regulation. If such soils exhibit a characteristic of hazardous waste, it must be because the uncontaminated soils, the Bevill wastes, or both exhibit a characteristic. The uncontaminated soils, whether characteristic or not, are not subject to regulation under Subtitle C. See Section III.A.1, above. Likewise, the Bevill wastes are excluded from Subtitle C regulation, whether or not they exhibit a characteristic. See Section II.A.3, above. A combination of two materials that are not subject to Subtitle C regulation is itself not subject to regulation under Subtitle C. Thus, soils contaminated only by Bevill wastes must be excluded from regulation under Subtitle C, including the Subtitle C LDR program.

2. Soil Contaminated with Bevill and Non-Bevill Wastes

[3] Issues of soil contamination resulting from "non-Bevill mineral processing wastes" will, by definition, potentially arise only at mineral processing facilities, and mineral processing operations at "integrated" facilities (see note 2, above). To the extent that they may be deemed "solid wastes," soils from extraction and beneficiation operations (such as mines and mills) are covered by the Bevill Amendment, even when such operations are conducted at an integrated facility, and thus not subject to Subtitle C regulation (including the LDR program).

The presence of soil contamination from both Bevill and non-Bevill wastes should not alter the conclusions set forth above. Even with contamination from non-Bevill wastes, these Bevill-contaminated soils should remain excluded from Subtitle C regulation. This is particularly true in the case of soils contaminated with non-Bevill mineral processing wastes, and thus cannot be used to subject soils contaminated with such wastes to Subtitle C regulation.

a. Soil Contaminated with Bevill and Non-Bevill Wastes Is Not Subject to Subtitle C Regulation

There are several reasons why soil at integrated mining and mineral processing facilities that is contaminated with both Bevill and non-Bevill wastes should not be subject to regulation under RCRA Subtitle C. First, the unambiguous language of the Bevill Amendment states that Bevill wastes are excluded from regulation under Subtitle C unless and until EPA makes a regulatory determination in accordance with the special procedural and substantive requirements of the Amendment that Subtitle C regulation is warranted. 42 U.S.C. § 6921 (b)(3)(A)-(C). EPA has not made such a determination for any Bevill wastes. On the contrary, the Agency has determined that Subtitle C regulation is not warranted for Bevill wastes from the mining and mineral processing industry. 51 Fed. Reg. 24,496 (July 3, 1986); 56 Fed. Reg. 27,300 (June 13, 1991). Subjecting soil contaminated in part by Bevill wastes to Subtitle C regulation would therefore violate the explicit language of the Bevill Amendment and EPA's own regulatory determinations made under the Amendment.

Moreover, the legislative history of the Bevill Amendment clearly demonstrates that Congress intended the scope of the Amendment "to incorporate waste products generated in the real world." 126 Cong. Rec. 3362 (1980) (remarks of Rep. Bevill). In the "real world," mineral processing operations are frequently conducted at integrated facilities, thus presenting the possibility that soils at the facility may become contaminated by both Bevill wastes and non-Bevill mineral processing wastes. (The same is true at some non-integrated mineral processing facilities, which may generate both Bevill wastes and non-Bevill mineral processing wastes.) If these contaminated soils were subjected to Subtitle C regulation, the Bevill Amendment, which was designed "to relieve the [Bevill Industries] of the onerous burden of stringent Subtitle C controls if at all possible," would be seriously undermined. See Environmental Defense Fund v. EPA, 852 F.2d 1309, 1315 (D.C.Cir. 1988).

With regard to soils contaminated by non-Bevill wastes that exhibit the TC, Subtitle C regulation is impermissible as a matter of law in light of the recent decision in Edison Electric Inst. V. EPA, 2 F.3d 438 (D.C. Cir. 1993) ("EEI"). In EEI, the U.S. Court of Appeals for the District of Columbia Circuit remanded the TC as it applies to non-Bevill mineral processing wastes. Thus, non-Bevill mineral processing wastes that are "hazardous" solely by virtue of the TC are not subject to RCRA regulation, a fact that EPA itself has conceded. See Brief of Respondent EPA in Mobil Oil Corp. v. EPA, No. 91-1211 and consolidated case (D.C. Cir.) At 55 n.46 and accompanying text. Accordingly, soil contaminated by characteristically "toxic" non-Bevill mineral processing wastes cannot be subject to Subtitle C regulation because the soil does not contain a "hazardous waste".

Finally, excluding soil that is contaminated with Bevill and non-Bevill wastes from Subtitle C regulation would be consistent with EPA's long-standing position that mixtures of Bevill and non-Bevill wastes from the utility industry are covered by the Bevill Amendment. See 58 Fed. Reg. 42,446, 42,469-70 (Aug. 9, 1992); January 13, 1981 Letter from Gary N. District, Associate Deputy

Assistant Administrator for Solid Waste, EPA, to Paul Emier, Jr., Chairman, Utility Solid Waste Activities Group ("Dietrich Letter"). EPA should take a similar approach here and exclude from regulation soil contaminated by both Bevill and non-Bevill wastes.

b. At a Minimum, Soil Contaminated with Bevill and Non-Bevill Wastes Should Not be Regulated under Subtitle C if It Is Not Significantly Affected By the Non-Bevill Wastes

If EPA decides, despite the arguments presented above, that soil contaminated with both Bevill and non-Bevill wastes may be subject to Subtitle C regulation, the Agency should at a minimum specify that such soil is not subject to regulation unless it is significantly affected by the non-Bevill wastes. In particular, EPA should state that soil contaminated with both Bevill and non-Bevill wastes at integrated facilities is excluded from Subtitle C regulation unless it exhibits a characteristic of hazardous waste that is not exhibited by either the Bevill waste or the uncontaminated soil.

This approach is not only the most logical one that could be selected by the agency (short of exempting these materials from regulation entirely), but it would also be consistent with other actions that have been taken by EPA. For example, EPA's longstanding position that mixtures of Bevill and non-Bevill wastes from the utility industry are not subject to Subtitle C regulation was based in large part on the fact that the "composition and character of the [Bevill] combustion wastes; that is, they do not significantly alter the hazardous character, if any, of the [Bevill] combustion wastes." Dietrich Letter, <u>supra</u>, at 5. In other words, the Bevill wastes, which by definition are "high volume, low hazard" wastes, <u>see</u>, <u>e.g.</u>, <u>Horsehead</u>, slip op. At 24, remain "low hazard" wastes even after being mixed with the non-Bevill wastes.

EPA previously has promulgated a test for determining whether residues from the co-processing of hazardous wastes with normal raw materials in a Bevill device retain their

Bevill status. 56 Fed. Reg. 7134, 7197 (Feb. 21, 1991) (codified 40 C.F.R. § 266.112(b)). The Agency did so out of recognition that:

> So long as the processing of hazardous waste does not significantly affect the character of the waste residues . . . then those wastes can remain excluded under the Bevill Amendment. Put another way, the wastes can potentially remain the type of material that Congress told the Agency to study before imposing Subtitle C regulation.

56 Fed. Reg. At 7197. Under EPA's test, which was recently upheld by the United States Court of Appeals for the District of Columbia Circuit in <u>Horsehead</u>, co-processing residues retain their Bevill status as long as they are not "significantly affect[ed]" by the hazardous waste. <u>Horsehead</u>, slip op. At 25. The Court found that the significantly affected test "is a permissible interpretation of the Bevill Amendment's low hazard criterion." <u>Id</u>.

EPA's rationale for promulgating the "significantly affected" test for Bevill residues also is applicable in the case of soils contaminated with insignificant quantities of hazardous, non-Bevill mineral processing wastes. Such soils can be "potentially remain the type of material that Congress told the Agency to study before imposing Subtitle C regulation," <u>i.e.</u>, "high volume, low hazard"

Bevill wastes. If EPA refuses to adopt a general exemption for soil contaminated by Bevill and non-Bevill wastes, it should establish a test similar to that promulgated previously for Bevill co-processing residues.

C. EPA's Proposed Definition of Hazardous Soil Must Be Modified So That It Does Not Cover Soils Containing Insignificant Amounts of Non-Bevill Mineral Processing Wastes

AMC is concerned that EPA's proposed definition of hazardous soil will encompass not only uncontaminated soils, and soils contaminated, in whole or in part, by Bevill wastes, but also Contaminated soils that are contaminated with non-Bevill mineral processing wastes. Although soils contaminated with non-Bevill wastes may be appropriately regulated in certain circumstances, they are not properly regulated in others.[4] In particular, soils contaminated with non-Bevill wastes should be excluded from Subtitle C regulation unless they exhibit a characteristic of hazardous waste that is not exhibited by the uncontaminated soil." (American Mining Congress, CS2P-00173) *[This comment has an attachment with additional data related to soil.]*

Response: EPA is not, at this time, taking action to finalize either the definition of "hazardous soil" or the so called "contained-in" policy. The preamble to today's final rule has a detailed discussion of when LDRs apply to contaminated soil and of the contained-in policy, which, at this time, the Agency believes will provide adequate guidance for program implementation.

The "contained-in" policy is discussed in detail in the preamble to today's final rule. Under current Agency guidance on implementation of the contained-in policy, soil determined to contain so called "de-Bevilled" waste would be subject to regulation under RCRA Subtitle C (this would include soil contaminated by both "de-Bevilled" and Bevill wastes). Soil contaminated by exempt Bevill wastes would, of course, also be exempt. Furthermore, EPA believes that it may be appropriate to determine that soil containing hazardous constituents at or below natural background concentrations should properly does not contain any solid or hazardous waste, and thus would not be subject to regulation as waste under RCRA. EPA notes that natural background concentrations are concentrations present in areas that have not be affected by releases or other human activities.

The commenter's long discussion of mixtures of Bevill and non-Bevill wastes in soils raises the same points as raised in conjunction with the Bevill mixture rule .As set forth in detail in the preamble and in other comment responses, EPA rejects the proposition that Bevill wastes can immunize regulated hazardous wastes by being mixed with them. There is no statutory language compelling such a result, and it is bad policy to allow an exemption to spill over to exempt regulated hazardous wastes. (The fact that there have been many damage incidents involving exempt Bevill mining wastes adds empirical support to this conclusion. There is no hint that each mixture will be managed in a manner which is protective of human health and the environment, as is required by section 3004 of RCRA for management of hazardous waste.) The argument that by regulating subtitle C hazardous waste-Bevill waste mixtures EPA will be regulating exempt Bevill wastes is incorrect. EPA would be regulating the garden variety subtitle C hazardous waste.

- "Reference Chapter **VII. Treatment Standards for Hazardous Soils** part B. Applicability, Regulatory Status of Treated Soils and Definitions: We are in favor of the Agency's pragmatic

[4] As discussed previously, soils contaminated with characteristically "toxic" non-Bevill mineral processing wastes are not properly subject to Subtitle C regulation.

proposal that would avoid requiring chemical analysis for soil properties in order to differentiate precisely between waste, soil and debris." (Biogenesis Enterprises, Inc., CS2P-00180)

Response: EPA appreciates this support of the definition of soil. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today.

- "The Definition of Hazardous Soil Should Encompass Soil Containing Characteristic Hazardous Waste Even if the Soil as a Mixture no Longer Exhibits the Characteristic. The definition of hazardous soil in the preamble includes only soils containing listed wastes and those soils that exhibit a characteristic. The definition, as drafted, does not include soils that contain a spilled or placed characteristic waste but cease to exhibit the characteristic. In our view, such soils that do not exhibit a characteristic achieved that status through dilution. We believe that 40 C.F.R. § commands that such soils be regulated because they contain a hazardous wastes, just as any other waste. Although we agree with the EPA that those in the regulated community are unlikely to rush to illegally contaminate soil, regulations that permit a characteristic waste to become unregulated as a result of an accidental spill do create an incentive to be less careful in managing hazardous wastes." (USPCI, CS2P-00171) [*This comment has an attachment with additional data related to soil.*]

Response: EPA is not, at this time, taking action to promulgate either a definition of "hazardous soil" or the so called "contained-in" policy. Although not codified, the contained-in policy will continue to be implemented, as appropriate, by EPA regions and authorized states. Current EPA guidance on implementation of the contained-in policy and the relationship of contained-in determinations to LDR treatment requirements is discussed in detail in the preamble to today's final rule. The Agency notes that it is not convinced, at this time, that it is necessary to change its longstanding policy regarding soil contaminated by spills of characteristic hazardous waste. The Agency's policy continues to be that soil contaminated by such spills is not automatically subject to RCRA Subtitle C requirements but, instead, is subject to RCRA requirements only if it is determined to contain hazardous waste or exhibit a characteristic of hazardous waste. The Agency further notes that it continues to believes that, in the case of soil contaminated by spills of hazardous waste, it is reasonable to determine that such soils do not contain hazardous waste if, when first generated, the soil do not exhibit a characteristic of hazardous waste. The Agency believes it is reasonable to treat soil contaminated by listed hazardous waste differently from soil contaminated by characteristic hazardous waste, in part, because there are clearly defined tests which can be applied to determine whether any given material, waste or soil, exhibits one of the hazardous characteristics. In addition, determining whether soil which does not exhibit a characteristic has been contaminated in the past with a characteristic waste poses very difficult administrative and implementation issues.

EPA also notes that it has a long-standing interpretation for characteristic wastes that new treatability groups are considered to be new points of generation for determining if LDR prohibitions attach, see 55 FR at 22661/2 (June 1, 1990), which would indicate that the soil is a new point of generation for LDR purposes because it is a new and distinct treatability group. Of course, such soil would continue to be subject to applicable cleanup authorities, including, applicable RCRA cleanup authorities.

EPA agrees with the commenter that deliberate mising of chraracteristic wastes with soil for purposes of avoiding proper treatment of the waste is impermissible dilution (it also would likely violate many other subtitle C regulatory provisions) and that therefore there is a strong disincentive not to engage in such conduct.

Finally, EPA notes that this comment was not repeated as a comment to the 1996 reproposal (although the same issue is presented). EPA's response here should not be viewed as conceding that this issue remains preserved for purposes of review..

- "1. Paragraph VII.B.4.a, page 48123, Definition of Hazardous Soils. The definition of hazardous soils should take into account constituents, such as metals, that occur naturally in soil. The application of 40 CFR 261, Subpart C, for defining hazardous waste characteristics should be modified for hazardous soils. A soil being classified as a hazardous waste should be the result of past "generator" activities and not because of a naturally occurring concentration of a constituent. Otherwise, a facility may be required to treat a particular constituent to a concentration below its naturally occurring concentration in the soil." (Department of the Army, CS2P-00160)

Response: EPA is not, at this time, taking action to promulgate either the definition of "hazardous soil" or the so called "contained-in policy." Although not codified, the contained-in policy will continue to be implemented, as appropriate, by EPA regions and authorized states on a site-specific basis. Current Agency guidance on implementation of the contained-in policy is discussed in detail in the preamble to today's proposal. The Agency agrees that, generally, soil with concentrations of hazardous constituents at or below naturally occurring background concentrations should not be determined to "contain" hazardous waste. In addition, EPA has concluded that treatment to comply with the soil treatment standards should not be required if constituent concentrations fall below naturally occurring background concentrations, provided the soil will continue to be managed on site or in an area with similar natural background concentrations. If soil will be sent for land disposal off-site, compliance with the alternative soil treatment standards is required, since the Agency believes that natural background concentrations on-site will not automatically correspond to natural background concentrations at a remote land disposal facility. This issue is discussed in more detail in the preamble to today's final rule.

- *K.W. Brown Environmental Services submitted an attachment entitled, "The Near-Future Option to Landfill Waste-Affected Soil" (see CS2P-00181.A).*

- "In the preamble, the EPA has proposed that the definition of hazardous soil allow site operators to determine whether the material to be excavated is waste, debris, or soil, by judging the results of simple in-situ mechanical removal processes to separate the materials. ENRON supports this position." (ENRON, CS2P-00187)

Response: EPA appreciates this support of the definition of soil. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today.

- "We applaud EPA for recognizing that materials encountered in remediation are often complex mixtures, and simple definitions of soil, sludge, debris, etc. don't reflect the sort of materials encountered in the remediation context. Remediation, and the relief so sorely needed from the existing RCRA requirements, is not limited to soils or sediments. In fact, the materials managed in remediation activities typically consist of a range(and often mixtures of) materials, running the gamut from soil, sediments, construction fill and ash through weathered sludges and the contents of one hundred year old solid waste landfills.

While these materials may be physically disparate they share many similar attributes. Generally they are the products of past, unregulated waste management activities or a potential releases. They are currently regulated not through typical solid waste management regulations but through specialized programs for environmental remediation. And they are addressed as integral parts of an overall remediation activity. To only exempt some of these materials from those portions of RCRA which currently inhibit remediation is to continue to inhibit the entire remedial process.

For example, on old basin may contain a sludge like material contaminated with toluene, surrounded by soils contaminated with toluene and adjacent to a stream whose sediments contain toluene. To provide regulatory flexibility for the soils and sediments such that they can be aggregated and treated on-site to levels protective of human health and the environment and redeposited, while requiring that the sludge be removed without stockpiling, incinerated to achieve LDRs and then buried in a RCRA land fill makes little sense. It also provides a significant disincentive for the owner/operator to undertake any remedial action, as that leads him closer to the outlandish excavation and incineration of the sludge." (DuPont, CS2P-L0003)

Response: EPA appreciates this support of the definition of soil and of tailored approaches to remediation more generally. Although the Agency is not, at this time, taking action to promulgate the definition of "hazardous soil," the definition of "soil" discussed in the 1993 LDR Phase 2 proposal and proposed in the 1996 HWIR-Media proposal is being promulgated, as proposed, today.

5.B.2 Definition of Constituents Subject to Treatment, and Procedures for Handling Non-analyzable Constituents

- "EPA's proposal is unclear with respect to the necessity of testing for constituents subject to the universal treatment standards. At various portions of the preamble (see 58 Federal Register 48098, and 48102), EPA indicates that only the constituents "regulated" in listed waste must be analyzed. This statement is not clear, in that it does not clearly indicate whether the "regulated" constituents are those which were the basis of listing or whether some other subset of the universal treatment standards are the "regulated" constituents. In other portions of the preamble, EPA indicates that it would only require "monitoring" to address constituents "reasonably expected" to be present in the waste. It is unclear, however, whether or not "monitoring requires testing, and whether "reasonably expected" must be based on testing, process knowledge or similar information which is detailed enough to ascertain whether tiny amounts of constituents subject to the UTS are present. This is particularly problematic for soils, especially given the likelihood of background metals." (Boeing, CS2P-00029)

Response: EPA has clarified that, in the case of soil subject to the LDRs, the soil treatment standards much be achieved for all underlying hazardous constituents reasonably expected to be present in any given volume of contaminated soil when such constituents are found at initial concentrations greater than 10xUTS. As discussed in the preamble to today's final rule, the Agency is confident that such constituents can be identified through applying knowledge of the soil and likely contaminants at the facility and that testing for the full suite of UHC should, therefore, seldom if ever be required. The Agency has also clarified that further treatment is not required if concentrations of hazardous constituents fall below naturally occurring background concentrations. These issues are both discussed, in detail, in the preamble to today's final rule.

- "The HWTC highly supports EPA's proposal approach for identifying the contaminants subject to treatment for contaminated soil. The HWTC feels that all of the constituents on either the UTS or the F039 list must be evaluated to determine if the concentrations exceed the respective BDAT standards. In remedial situations the HWTC agrees with EPA's conclusions that soils are frequently contaminated with a variety of hazardous constituents that go well beyond the constituents usually associated with the listed or characteristic wastes. The HWTC agrees fully with EPA's rationale on page 48123 and 48124 that all contaminants on the UTS and/or F039 list must be evaluated.

  The HWTC does not agree with EPA's proposal not to require analysis data. Without mandatory analytical determinations, it is impossible to prove or demonstrate by knowledge what constituents are present, and if the quantities exceed the BDAT standard levels. Only analytical determinations can be used to definitely show the presence of these constituents in the wide variety of wastes from numerous sources. At least a one time analysis should be required." (Hazardous Waste Treatment Council, CS2P-00060)

Response: EPA is not, at this time, persuaded that it is necessary to require certain types of mandatory analysis for all potentially hazardous contaminated soil. The Agency continues to believe that analysis should be appropriately focused, using knowledge of the site, soil, and likely contaminants, on constituents of concern or classes of constituents of concern. This is consistent with the approaches the Agency is taking in remediation programs and with the Agency's longstanding rules (judicially upheld) on application of knowledge to determinations about whether any give solid waste is hazardous, and which hazardous constituents are subject to treatment requirements.

- "Page 48124. U.S. EPA is proposing that hazardous soil would be treated for each constituent subject to treatment, regardless of whether the contaminating waste is a listed or characteristic waste. This is going to be very difficult for a regulatory agency to enforce because regulators don't always know what constituents should be "reasonably expected to be present". Cleaning up an abandoned site will require that the soil be analyzed for all of the universal waste constituents." (Association of State and Territorial Solid Waste Management Officials, CS29-00091)

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Response: EPA is not, at this time, persuaded that it is necessary to require certain types of mandatory analysis for all potentially hazardous contaminated soil. The Agency continues to believe that analysis should be appropriately focused, using knowledge of the site, soil, and likely

contaminants, on constituents of concern or classes of constituents of concern. This is consistent with the approaches the Agency is taking in remediation programs and with the Agency's longstanding rules on application of knowledge to determinations about whether any give solid waste is hazardous, and use of knowledge to determine LDR applicability.

- "Nonanalyzable Constituents (page 48124): GM strongly supports the Agency's decision to not propose treatment standards for nonanalyzable constituents in hazardous soil. We also advocate allowing the use of technologies other than those specified in S268.42 for treatment of soils containing nonanalyzable constituents." (General Motors, CS2P-00095)

Response: EPA appreciates this support for the Agency's approach to nonanalyzable constituents.

- "The discussion regarding non-analyzable constituents seems out of context with the proposed regulations. How can a RP or the EPA determine if a contaminant is present if there are no proven analytical methods to determine its concentration level??

  Also, if it in non-analyzable, how will a contractor know when if the treatment process is working?" (Southwest Soil Remediation, CS2P-00109)

Response: As discussed in detail in the preambles to the LDR Phase 2 and HWIR-Media proposals, sometimes soil is contaminated with both analyzable and nonanalyzable constituents. The nonanalyzable constituents would be known to be present, for example, by applying knowledge of the likely soil contaminants. In the case of soil contaminated with both analyzable and nonanalyzable constituents, EPA believes treatment of the analyzable constituents will serve as a surrogate for treatment of the nonanalyzable constituents. In the case of soil contaminated by only nonanalyzable constituents, treatment by the specified treatment method is required.

- "Treatment of analyzable constituents in soils should provide adequate treatment of nonanalyzable constituents as well.

  Westinghouse supports the Agency's proposal not to issue treatment standards for nonanalyzable constituents found in hazardous soils. We agree that treatment of analyzable constituents to meet specified treatment standards should provide adequate treatment of the nonanalyzable constituents." (Westinghouse Electric Corp., CS2P-00115)

Response: EPA appreciates this support for the Agency's approach to treatment of nonanalyzable constituents.

- "Eliminating the wastes currently listed in 40 CFR 268.42 from using the universal standards proposed under the new ruling may effectively eliminate the use of innovative technologies for remediating most soils containing pesticide or solvent contaminants. For example if RCRA soils at an abandoned air strip site contain toxaphene in addition to DDT, malathion etc., then the site must be treated with either biodegradation or incineration.

I agree with the motivation behind the proposed standards described in the 5th paragraph." (Southwest Soil Remediation, CS2P-00109)

Response: Under today's final rule contaminated soils subject to the LDRs may be treated either to the universal treatment standard for the contaminating waste or to the soil treatment standards promulgated today. EPA believes the soil treatment standards promulgated today can be routinely achieved using non-incineration technologies.

- "EPA should consider natural background levels for metals in treatment standards for hazardous soils. Westinghouse requests that EPA clarify the issue of treating soils to levels that are below background concentrations and require treating soils only for those constituents that should be reasonably be expected to be present in the contaminated media. As an example, many waste sites are located adjacent to roadways, and often lead and benzene, toluene, ethylene and xylene (BTEX) levels are found at elevated levels. In some cases, the treatment standards are more restrictive than the risk based levels pursuant the CERCLA." (Westinghouse Electric Corp., CS2P-00115)

Response: EPA has clarified in today's final rule that further treatment is not required when constituent concentrations fall below naturally occurring background concentrations. (EPA notes that in the situation suggested by the commenter, contamination by BTEX constituents along roadways, it is unlikely such contamination would be considered "natural" background, since it is likely the result of human activities.) In addition to clarifying the background issue, EPA has provided an opportunity for site-specific, risk-based levels to cap the technology-based soil treatment standards, provided such levels are found to minimize threats within the meaning of RCRA Section 3004(m) and are approved through a treatment variance. The so called site-specific, risk-based minimize threat variance is discussed in detail in the preamble to today's final rule.

- "EPA proposes to require hazardous soil to meet treatment standards for any regulated constituents found in Table UTS.

  Westinghouse opposes this proposal. As with ignitable and corrosive wastes and the proposed TC organic wastes, Westinghouse believes that EPA should not require the testing of underlying constituents unless the waste is regulated for those constituents. EPA should revise how they define the universe of regulated wastes (most probably resulting from the finalization of the HWIR) before it imposes LDR requirements on constituents that do not cause the waste to be regulated. Inequities described in our comments in Section IV.A. in the LDR program create confusion in the regulated community. This is particularly true of soil matrices. As EPA stated, "soils (like multi-source leachate) frequently are contaminated with an enormous variety of contaminants from diverse sources." These soils may or may not be regulated hazardous waste. Those that are regulated because they contain constituents from a listed source may be much less inherently hazardous than soils that have no listed or characteristic component. This concept creates an "all-or-nothing" regulatory approach. Before EPA imposes rigorous LDR compliance monitoring requirements, the Agency should redefine what defines a waste under the RCRA program." (Westinghouse Electric Corp., CS2P-00115)

Response: EPA is not, at this time, taking action on the portions of the LDR Phase 2 or HWIR-Media proposals that would have codified the contained-in policy. Like many commenters, EPA continues to believe legislation is necessary to reform the regulation of remediation waste, including contaminated soil, under RCRA Subtitle C.

In the meantime, today's soil treatment standards will apply to any contaminated soil subject to LDRs and treatment will be required for all underlying hazardous constituents reasonably expected to be present when such constituents are found in initial concentrations greater than 10xUTS. Since, as discussed in both the 1992 and 1996 proposals, contaminated soils are potentially contaminated with a wider range of hazardous constituents than process wastes, EPA believes this approach is prudent in light of the *Chemical Waste* opinion which addressed a similar circumstance (potential presence of wide variety and concentrations of hazardous constituents) for wastes that were hazardous because they failed the toxicity characteristic leaching procedure. See *Chemical Waste Management v. US EPA*, 976 F.2d at 16-18 (D.C. Cir 1992). This issue is discussed in detail in the preamble to today's final rule.

- "Uniroyal Chemical supports the language proposed in 40 CFR 268.7 (a) (10) and (11) wherein the responsibility for determining underlying hazardous constituents in hazardous soils and the certification requirements will continue to be noninteractive with regard to the Environmental Protection Agency. This is a particularly important consideration for generators of hazardous soil who manage their hazardous waste activities within the constraints of 40 CFR 262.34 which limits the on-site storage to less than ninety days.

  Since the hazardous waste program was initiated, it has been the generator's responsibility to manage and remedy on-site spills when they occur. Unless a spill is significant, the generator identifies the waste and manages it within the bounds of the hazardous waste management program. Waste analyses of identification by process knowledge have been self-implementing with a records retention requirement to date. It is important for generators who manage their wastes in less than 90-day accumulation storage areas that the alternative treatment standards for soil remain self-implementing. Specifically, if a generator selects a treatment method which will meet the 90% removal should be communicated between the generator and off-site treatment/disposal facility and retained in the waste analysis file only. It should not become an additional reporting burden to the agency or require agency approval; i.e., Uniroyal supports the regulations specified in 40 CFR 268.7 (a) (10) and (11)." (Uniroyal Chemical Company, Inc., CS2P-00140)

Response: The agency appreciates this support of its approach to constituents subject to treatment.

- "The Army has many clean-up sites which will generate hazardous media. The proposed rule could benefit both waste management and remediation activities by exclusion of low risk media from RCRA Subtitle C regulations. This would allow scarce resources to be spent in other areas to better protect public health and environment.

  2. Paragraph VII.B.4.d, page 48124, Nonanalyzable Constituents. Comments were requested on establishing treatment standards for soils with nonanalyzable constituents. (A clarification or definition is needed for "nonanalyzable". Does this mean analytical methods are not available or the constituents cannot be routinely analyzed using SW-846 methods within an allowable magnitude of a set standard? We assume the later.)

  a. Soils contaminated with multiple constituents, some of which are nonanalyzable. Demonstrating that the treatment standards for the analyzable constituents have been met for soils contaminated with multiple constituents, both analyzable and non-analyzable, should be sufficient. However, the methods used to treat these soils should be approved for the treatment of the nonanalyzable constituents.

  b. Soils contaminated solely with nonanalyzable constituents. Treatment methods for soils contaminated only with nonanalyzable constituents should be specified in 40 CFR 268.42. These methods should only serve as a base line. The waste generator should be allowed to demonstrate other methods may proposed treatment standards. A process is needed in which a waste generator can petition for the use of an alternate method.

  c. Media contaminated with nonanalyzable constituents should still be eligible for an exemption or exclusion should be allowed under the proposed "contained-in" determination and any other options developed from the re-proposal of the Hazardous Waste Identification Rule.

  d. Constituents identified as having analytical methods with a quantitation limit two orders of magnitude greater than the treatment standard should not be considered nonanalyzable for treatment purposes. Constituents identified as having analytical methods with a quantitation limit two orders of magnitude greater than a health based level should not be considered nonanalyzable and completely ineligible for an exemption. Media contaminated with these constituents should still be eligible for an exemption or exclusion from RCRA Subtitle C regulations." (Department of the Army, CS2P-00160)

Response: These comments deal with treatment of soil contaminated with nonanalyzable constituents. As discussed in both the 1993 and 1996 proposal, and finalized in today's final rule, soil contaminated with both analyzable and nonanalyzable constituents should be treated to meet the treatment standards for the analyzable constituents. The Agency continues to believe this treatment will generally serve as an adequate surrogate for treatment of nonanalyzable constituents. Soil contaminated Solely with nonanalyzable constituents should be treated using the treatment method specified in the regulations, unless an alternative treatment method is approved by EPA or an authorized state. These principals apply regardless of the practical quantiation limits associated with any given nonanalyzable constituent.

- "The LDEQ agrees with EPA's approach for non-analyzable constituents in soils. It is felt that treating for analyzable constituents should provide treatment to appropriate levels for non-analyzable constituents. The EPA should reserve the right to change this when the methods to analyze and classify these constituents becomes available. The LDEQ also agrees with the Agency's proposed treatment method for non-analyzable U or P wastes unless the other technologies have demonstrated that they can remove the hazardous constituents from the soil." (Louisiana DEQ, CS2P-00167)

Response: The Agency appreciates this support for its approach to treatment of nonanalyzable constituents.

- "Non-analyzable constituents: API supports the definition proposed by EPA. API agrees that for those constituents where there currently exists no analytical method to quantitatively determine their concentration in a hazardous soil, treatment for constituents for which there are adequate methods should satisfy the LDR requirements." (API, CS2P-00169)

Response: The Agency appreciates this support for its approach to treatment of nonanalyzable constituents.

- "Constituents Subject to Treatment: EPA has proposed this term to mean any constituent or constituents, present in a hazardous soil at a level or levels above the universal treatment standard(s).[5] Such a definition is unacceptable in that it could require a person managing hazardous soil to undertake an extremely detailed sampling and analysis program to characterize an entire site in order to confirm the suite of constituents that are or are not present. This type of detailed analysis is cost prohibitive, and in most instances, unnecessary. Generators of hazardous soil – similar to generators of hazardous waste – should have the option of relying on their knowledge of the site, site records, and waste management history among other factors, to limit the number of constituents of concern for a particular remediation." (API, CS2P-00169)

Response: As discussed further in the preamble to today's final rule, the Agency is persuaded

[5] In determining whether a particular volume of hazardous soil warrants treatment, API believes that it is important to consider whether the universal treatment standard for an individual constituent is below the known naturally-occurring background level for that constituent. One should not have to treat soils to levels that are below naturally-occurring background concentrations.

that it is prudent to apply the logic of the *Chemical Waste* opinion to contaminated soil. For that reason, contaminated soil subject to the LDRs must achieve treatment standards for all underlying hazardous constituents reasonably expected to be present in any given volume of contaminated soil when such constituents are found at initial concentrations greater than 10xUTS. The Agency is confident that generators can apply knowledge about likely soil contaminants to target sampling and analysis to ensue that it is focused on appropriate constituents or classes of constituents.

5.B.3 Illegal Contamination of Soil

- "The incentive for illegally mixing hazardous waste with soil to avoid more stringent standards is minimal. The increase in volume of a waste due to dilution with soil would quickly cancel out any cost incentive even though incineration has about ten times the cost of direct disposal in a hazardous waste landfill. Therefore, The Boeing Company does not believe that additional safeguards are necessary." (Boeing, CS2P-00029)

Response: EPA agrees that existing safeguards will adequately minimize incentives to illegally manage prohibited hazardous waste in a way that creates contaminated soils for the purpose of, then, applying the soil treatment standards.

- "B. Non-permissible Mixing of Soils

  The HWTC supports EPA's proposal on this matter." (Hazardous Waste Treatment Council, CS2P-00060)

Response: EPA appreciates this support of the proposed approach. The Agency continues to believe that existing safeguards will adequately minimize incentives to illegally manage prohibited hazardous waste in a way that creates contaminated soils for the purpose of, then, applying the soil treatment standards.

- "<u>Illegal Contamination</u> (58 FR 48124)

  AWPI is concerned that the rule as proposed will make it impossible to conduct cleanup of contaminated sites without being exposed to civil and criminal prosecution. Removing contaminated soil will always capture some clean soil due to equipment limitations and analytical characterization limitations. As proposed, this would technically constitute illegal commingling. Further, some forms of treatment require homogenous soil concentrations to set effect treatment parameters. These sorts of activities should not make the generator or his treatment contractor subject to civil or criminal penalties." (American Wood Preservers Institute, CS2P-00047)

Response: EPA takes this opportunity to clarify that the normal mixing of contaminated soil that typically occurs within areas of contamination at any given remedial site during the course of remedial activities or in the course of normal earthmoving and grading activities is not considered intentional dilution and is not impermissible. This is the case even if concentrations of hazardous constituents vary across the area of contaminated (as is typically the case), provided the intent of such mixing is not to circumvent the LDR treatment standards. The Agency notes that, given that contaminated soil is, by it's nature heterogenous and dispersed across facilities, any other approach would seem to present insurmountable implementation difficulties. In this way contaminated soil is different from hazardous wastes generated by on-going industrial operations. Such pure, industrial hazardous wastes are typically generated at distinct points in a process, can be easily segregated from other materials at their point of generation, and, compared to contaminated soils, are relatively homogenous.

- "The U.S. EPA should reevaluate whether the absolute prohibition against mixing wastes with soil should be applied at remediation sites. The U.S. EPA rather broadly states on 58 FR pages 48123 and 48124 of the preamble that the deliberate addition of hazardous constituents or hazardous waste to soil constitutes illegal contamination of soil which is punishable by civil and criminal penalties. In our view, this prohibition against mixing should apply to as-generated hazardous waste, but should not apply in the context of remedial actions. A blending operation (which is part of the site cleanup activities) to even out the concentration of contaminants with in the soil feeding into a treatment system is an important preliminary step in the process design for a number of soil treatment technologies. For example, mixing to control the BTU content of the soil feed is a critical aspect for all the materials at these sites in the most cost-effective manner which is adequately protective of human health restrictions, such as the prohibition against mixing, which conflict with this goal." (ASTSWMO, CS2P-00091)

Response: EPA takes this opportunity to clarify that the normal mixing of contaminated soil that typically occurs within areas of contamination at any given remedial site during the course of remedial activities or in the course of normal earthmoving and grading activities is not considered intentional dilution. This is the case even if concentrations of hazardous constituents vary across the area of contaminated (as is typically the case), provided the intent of such mixing is not to circumvent the LDR treatment standards. The Agency notes that, given that contaminated soil is, by it's nature heterogenous and dispersed across facilities, any other approach would seem to present insurmountable implementation difficulties. In this way contaminated soil is different from hazardous wastes generated by on-going industrial operations, such pure, industrial hazardous wastes are typically generated at distinct points in a process, can be easily segregated from other materials at their point of generation, and, compared to contaminated soils, are relatively homogenous.

- "Illegal Contamination of Soil (page 48124): GM agrees that the existing prohibitions (Sections 268.3 (a) & (b), 268.41 (b), and 3008 (a)) are sufficient to deter deliberate addition of hazardous constituents or wastes to soil (or vice versa). We do not see a need for addition safeguards. However, the use of spent materials (including process wastes) as substitutes for commercial treatment materials (e.g., spent acid used for neutralization of corrosive soil) should be specifically allowed." (General Motors, CS2P-00095)

Response: EPA appreciates this support of the Agency's approach to illegal contamination of soil.

The use of spent materials, including process wastes, as substitutes for commercial treatment material is not the subject of today's rulemaking and continues to be governed by existing regulations.

5.C. COMMENTS ON PROPOSED APPROACHES FOR ESTABLISHMENT OF TREATMENT STANDARDS FOR SOILS (See Chapter 11 and Sections 27.A and 27.C)

- "It is unclear as to whether the EPA plans to make all three proposed alternatives available for hazardous soils, or whether only one will be selected for final promulgation. Proposed language for 40 CFR 268.47 makes it appear that EPA will be promulgating all three. The EPA should clarify its intent.

  In the event only one of the alternatives is selected, we believe the second option is the most technically sound. This option requires that one achieve a ceiling concentration of one order of magnitude above the universal treatment standard (UTS) irrespective of treatment efficiency, and would provide the greatest treatment flexibility while limiting threats to the environment. We recognize that there would be instances where a soil could not be treated to this level due to high initial concentrations, which could result in the need to pursue more aggressive treatments such as incineration. However, we believe this drawback is outweighed by the benefits of this approach over the other alternatives.

  Selecting the first option would also provide for a ceiling one order of magnitude greater than the UTS, but would additionally require a 90% treatment efficiency. If this alternative were selected, situations would arise where the initial concentration of a constituent was slightly above the ceiling concentration, requiring that it be reduced by 90%. If this efficiency could not be achieved, the soil would be subject to the base UTS concentration which also could not be met, leaving as the only alternative a site-specific treatability variance.

  The third option would require a 90% treatment efficiency without a concentration ceiling. While appealing for most scenarios, as EPA stated in the preamble, allowing this option for highly contaminated wastes could result in the land disposal of high levels of toxic constituents. It would be preferable to require more severe treatment of these wastes to meet a concentration limit than to allow the disposal of such materials without additional criteria specified for assessing risk." (INEL, CS2P-00018)

- “A summary describing the interaction between UTS and cleanup activities involving soil removal should be included in the final rule. Since the UTS includes contaminants that can be naturally occurring, does a facility have to treat the soil below background concentrations for naturally occurring contaminants? The EPA should also describe what would constitute adequate documentation for background evaluation.” (INEL, CS2P-00018)

- “The development of UTS including the position of establishment of a ‘Ceiling Limit’ for achieving concentration based treatment standards for soil is acceptable. In addition, the EPA should consider establishing a treatment technology for soil that would allow facilities to achieve LDR treatment standards by some other means other than achieving a concentration based standard. Regardless whether the treatment technology result in ‘exiting’ Subtitle C regulations, by establishing alternative technologies, a facility could continue to store LDR regulated waste under the LDR storage prohibition without any legal implications.

  The EPA’s position on the development of an ‘exiting Criteria’ for Subtitle C regulation is acceptable. The de minimis level for listed waste should be based on being protective of human and health and the environment (the same as the LDR requirements). Since HSWA mandates that LDR treatment standards be protective of human health and the environment; the development of UTS/Ceiling Limits (or other LDR standards) should be satisfactory for exiting Subtitle C regulation.

  The development of UTS is acceptable. However, of the three options presented in the proposed rule, only one of the three seems appropriate. The UTS for soil should be achieved by meeting a ‘Ceiling Limit.’ Also, there should in addition be a treatment technology expressed as an alternative. The establishment of ‘Ceiling Limits’ for soil due to the variability of soil matrices is a reasonable approach.

  The establishment of a ‘Ceiling Limit’ and meeting a 90% reduction would not be well suited for the regulated community. The additional paperwork and associated calculations would be prone to errors and is not as straight forward as achieving a numerical or technical based standard by itself. In addition, compliance with both criteria would result in waste containing various concentrations being disposed (some of which would be below the UTS/Ceiling Limit). The complexity associated with compliance evaluation for these various concentrations would be time consuming and difficult to evaluate. The proposed rule includes establishing UTS (or Ceiling Limits) in an order to have consistent regulatory levels for waste constituents. Meeting both criteria (e.g. Ceiling Limit and 90% reduction) appears to be inconsistent with the initial purpose of proposing UTS/Ceiling Limits. It makes no sense to require treatment to levels that are inconsistent for the same constituent. The UTS/Ceiling Limits are required to be protective of human health and the environment and therefore should be satisfactory without the addition of a 90% reduction requirement.

The requirement of a 90% reduction for each contaminant, by itself, does not appear to protective to human health or the environment due to the potential for land disposing soil containing high concentrations of contaminants. In addition, HSWA requires that levels be established that are protective. A 90% reduction, by itself, does not appear to meet this criteria." (INEL, CS2P-00018)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The option promulgated today is consistent with the commenters recommendation in that future treatment will not be required when constituent concentrations fall below 10xUTS.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA has provided a detailed discussion of the relationship of LDR treatment requirements to the contained-in policy and to remediation activities generally, in the preamble to today's final rule. As part of that discussion, EPA has clarified that, for purposes of LDRs, further treatment is not required when concentrations of hazardous constituents fall below naturally occurring background concentrations.

- "HWAC strongly supports the development of reasonable regulatory programs to protect human health and the environment from the adverse effects of exposure to hazardous and solid wastes. Consistent with our overall RCRA regulatory philosophy outlined above, HWAC strongly supports the development of alternative treatment standards for hazardous soils that encourage flexibility and the use of a wide range of remediation technologies to meet LDR restrictions while at the same time providing the regulated community with nationally consistent standards. HWAC also believes that mixed radioactive hazardous soil should be subject to these alternative treatment standards for soil, rather than the treatment standards for the contaminating waste.

  EPA's hazardous soil proposal is an important step in providing clear regulatory direction to the regulated community with respect to the management of various types of contaminated environmental media. Proper management of hazardous soils is a critical component of the overall RCRA regulatory effort, and HWAC agrees with EPA's philosophy of establishing specific mechanisms for determining the RCRA regulatory status of hazardous soils, including radioactive mixed wastes. This approach will allow hazardous waste engineering firms to focus more effectively on the best practicable technical solutions to satisfy RCRA requirements. It also will help increase overall RCRA program efficiency and encourage cost-effective responses to RCRA LDR treatment requirements.

HWAC understands and concurs with EPA's statement in the proposed rulemaking that:

"Soils (like multi-source leachates) frequently are contaminated with an enormous variety of contaminants from diverse sources. A treatment scheme that ignored this reality would not fulfill the requirement of §3004(m) of RCRA that the hazardous constituents present in prohibited wastes be treated so as to minimize threats to human health and the environment." (58 Fed. Reg. at 48,124)

EPA has used this rationale for requiring hazardous soil to be treated for each constituent subject to treatment, regardless of whether the contaminating waste is a listed or characteristic waste. In addition, EPA is proposing to define constituents subject to treatment as any regulated constituent found on Table UTS of the proposed rule. (The constituents in Table UTS are all of the BDAT listed hazardous constituents that can be analyzed.)

While HWAC strongly supports EPA's attempts to encourage flexibility and the use of innovative technologies, HWAC is nevertheless concerned that the establishment of hazardous soils treatment standards based solely on a BDAT standard philosophy is neither appropriate nor cost-effective. As noted with respect to the proposed LDR UTSs, HWAC recommends that any hazardous soil standards be based upon the risks to human health and the environment posed by the hazardous constituents contained in this media. Congressional sentiment for risk assessment to be part of this process can be noted in support for the proposed Risk Communication Act of 1993 (H.R. 2910). Basing treatment standards solely on BDAT may force the selection of technologies that do not cost-effectively protect human health and the environment, while incorporating risk assessment in the process of establishing treatment standards could foster the development of potentially less costly innovative technologies to solve hazardous waste problems today and in the future.

HWAC members have conducted many thousands of RCRA projects utilizing virtually all types of treatment technologies. Member firms make treatment selection recommendations to clients that are free from any biases toward particular technologies. Instead, these recommendations are based on a broad range of project-specific factors, such as the waste constituent characteristics, national treatment capacity considerations, specific site conditions, cost-effectiveness, and whether the remedy is protective of public health and the environment. Thus, HWAC believes that EPA's overall RCRA goals can best be met when there is flexibility to utilize a broad range of technologies with the specific needs of each land disposal treatment facility.

Moreover, HWAC believes that EPA cannot justify the need for treatment of all constituents under the proposed regulatory scheme without basing the treatment standards on an assessment of the current and potential threat to human health and the environment using site specific considerations. The only mechanism of reasonably and cost-effectively fulfilling the requirements of §3004(m) of RCRA is to base treatment standards on a case-by-case assessment of the relative risks to human health and the environment posed by the hazardous constituents present at a site.

EPA has proposed three different approaches for establishing treatment standards for hazardous soils, all of which are technology-based. Under these approaches, the proposed LDR universal treatment standards would be used as "base" standards for regulating hazardous soils. Using these "base" standards, EPA proposes the following alternative approaches for imposing LDR standards on hazardous soils:

(1) the use of a range of treatment standards with a "ceiling" one order of magnitude above the universal standard, provided 90% treatment of each hazardous constituent subject to treatment is achieved;

(2) the use of a range of standards with a "ceiling" one order of magnitude above the universal standard, but no broad-sweeping treatment requirement; or

(3) attainment of only a 90% treatment requirement irrespective of any universal treatment standard, unless this treatment level would result in waste concentration levels below the proposed LDR universal treatment standards in which case these levels would apply instead.

EPA has suggested that any of these proposed approaches would encourage the use of effective innovative (i.e., non-incineration) technologies.

If EPA elects to go forward with solely a technology-based approach for establishing treatment standards, HWAC recommends that the best option for EPA to adopt would be a modification to alternative (1) to allow the greatest flexibility in achieving these standards. Under HWAC's proposal, the regulated community should have the option of either attaining a 90% treatment requirement or achieving a ceiling value one order of magnitude above the universal treatment standards, provided that, in either case, necessary risk reduction goals are met. This approach would provide reasonable flexibility in selecting the appropriate technology for treatment, yet avoid the unduly inflexible characteristics of EPA's proposed options and the environmental protection concerns that might be associated with their use. Moreover, given current enforcement sanctions, HWAC agrees with EPA that most generators of hazardous waste would not mix prohibited hazardous waste with soils and, thus, does not believe that it would be necessary to impose any further safeguards to prevent this problem at this time." (HWAC, CS2P-00020)

Response: EPA appreciates the support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." Deferring a decision on soil treatment standards to the HWIR-Media rulemaking process was consistent with the majority of comments on the LDR Phase 2 proposal.

EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule. EPA notes that 90% capped by 10xUTS is the treatment standard recommended by this commenter.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

In addition, EPA is finalizing the approach to constituents subject to treatment proposed in the LDR Phase 2 proposal and supported by this commenter. Under today's final rule, the soil treatment standards will apply to all soil subject to land disposal restrictions and will require treatment of all underlying hazardous constituents reasonably expected to be present in any given soil volume which such constituents are found at initial concentrations that exceed 10xUTS.

- "RETEC proposes that EPA incorporate a hazardous soil treatment standard that would require treatment of 95% of the bioavailable (measured as leachable) organic contamination and 40% of the total organic contamination. We would propose that this approach to establishing hazardous soil treatment standards be in addition to the universal based standards in the proposed rule." (RETEC, CS2P-00026)

- "RETEC proposes that EPA adopt hazardous soil treatment standards that incorporate a high percentage reduction in bioavailability as an option to utilizing approaches in the proposed rule. The RETEC proposal would have the following advantages:

  - complies with the requirements of 3004(m) to identify the best available treatment technology.

  - is fully protective of human health and the environment.

- it would provide the regulated community flexibility in identifying the most cost-effective manner to achieve the objectives of HSWA.

- the quantity of hazardous soil managed in incinerators is reduced, avoiding a number of environmental impacts of concern to the public.

- provide the option for people to continue to use the universal treatment standards approaches proposed by EPA." (RETEC, CS2P-00026)

- "In prior discussion with EPA staff members concerning this approach, a number of potential problems were cited with initial versions of the RETEC proposal. RETEC has addressed these concerns and has proposed solutions that insure full compliance with HSWA Section 3004(m)." (RETEC, CS2P-00026)

- "Some may claim that the RETEC proposal would potentially leave a treated residual that could pose a risk from direct ingestion. However the Agency has already dealt with that issue with hazardous soil contaminated with metals. The metal standards are based on TCLP extracts. Hazardous soil that meets the land disposal restriction limits still must be managed in a fully permitted land disposal facility." (RETEC, CS2P-00026)

- "RETEC believes of each of the proposed approaches exceed the requirements of Section 3004(m). In addition all of the proposed approaches will not achieve the Agency's desire to provide the regulated community alternatives to incineration. This will cause a misallocation of society's resources and a number of adverse environmental impacts. (RETEC, CS2P-00026)

- "In addition to our general concern over the numerical treatment standards, RETEC is concerned that in many soil matrices bioremediation will plateau at a level less than 90% removal. However, for some hazardous soil matrices bioremediation will achieve the "Ceiling" of one order of magnitude above the treatment standard.

  This would result in the regulated community being confronted with the situation that bioremediation will achieve the "Ceiling" EPA has identified but not achieved 90% removal. In these cases, inappropriate technologies such as incineration would be required. This would not achieve EPA's objective of using innovative technologies." (RETEC, CS2P-00026)

- "If the universal treatment standards and the "ceiling" are established to allow the regulated community an option to incineration, RETEC believes that this is the best option of the tree approaches proposed. However, as noted in Section 2 of these comments, we believe an approach that incorporates bioavailability as measured in a leachable extract would be a more cost effective means to compliance with RCRA section 3004(m).” (RETEC, CS2P-00026)

- “In many soil matrices bioremediation will achieve 99% removal of the bioavailable material, but not achieve 90% removal of the total constituent analysis. For this reason, this approach does not achieve EPA’s objectives of providing innovative technology options for the regulated community.” (RETEC, CS2P-00026)

Response: All of these comments were submitted in support of the commenter’s suggestion that EPA base soil treatment standards, in part, on removal of a percentage of bioavailable (rather than total) hazardous constituents. These comments are in support of biotreatment. EPA is not persuaded that it is necessary to base soil treatment standards, in part, on removal of a percentage of bioavailable (rather than total) hazardous constituents to support appropriate use of bioremediation for soil treatment. In analysis of EPA’s Soil Treatment Database, 150 of 165 data pairs (90%) treated by bioremediation were successfully treated to compliance with the soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as “90% capped by 10xUTS.” EPA is finalizing the 90% capped by 10xUTS treatment standard in today’s final rule.

The basis for EPA’s April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- “It is unclear from the text of proposed rule 40 CFR 268.47(b) whether the three alternatives outlined are options to be selected from by the generator or treater/disposer, or whether EPA intends to select one alternative and revise the provision to delete the others. Each approach has merit, and maximum flexibility would be preferred.”

  Boeing suggests that generators be allowed to use either approach 2, proposed 268.47(b)(2) or approach 3, proposed 268.47(b)(3).

  The application of standards for the constituents in the UTS table for hazardous soil, especially soil which contains listed waste, may in many cases constitute much more stringent standards than are presently required. In reality, the majority of industrial sites are not similar to hazardous waste landfills and should not contain contamination that is similar to and as diverse as multi source leachate. As stated in 58 FR 48134, for listed waste “EPA has identified all the potential hazardous constituent that could be in

> the waste and specified those that must be treated." This same statement should be applicable to soil which contains a listed hazardous waste. Therefore, The Boeing Company believes that the only treatment standards that should be applied to listed hazardous soil are for the specific constituents that EPA has identified for the particular hazardous waste that is contained in the soil.
>
> Two of the proposed alternative treatment standards use a "ceiling" of one order of magnitude above the universal standard. The majority of universal treatment standards for organics are based on incineration and are as a result very low. An order of magnitude is not sufficient to provide significant relief especially considering the additional costs of treating soil on-site or to use nonthermal off-site treatment. As a result, a great deal of hazardous soil will continue to go to RCRA incinerators. EPA has failed to recognize to treat soil on-site requires permitting and approval by local, state and federal agencies. In addition, off-site commercial treatment facilities for hazardous soils besides incinerators are rare, may not be suitable for a particular waste or may be too far away, making transportation costs prohibitive. Boeing proposes a treatment standard <u>two</u> orders of magnitude above UTS, this would allow necessary flexibility for the generator." (Boeing, CS2P-00029) [Also See Chapter 27.A.]

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

This commenter specifically suggests a soil treatment standard of two orders of magnitude above the UST, indicating that such a standard is necessary to ensure that contaminated soil can be reliably treated using non-combustion technologies. As discussed in detail in the preamble to today's final rule and in the relevant Background Documents, the Agency disagrees. The Agency's analysis shows that the soil treatment standards promulgated today (90% capped by 10xUTS) can routinely be achieved using non-combustion technologies. In situations where a well-designed, well-operated application of one of the model (non-combustion) technologies on which today's treatment standards are based failed to achieve the standard, a generator would be eligible for a treatment variance, based on a finding that the treatment standard was unachieveable in his/her waste. See 40 CFR 268.44(h).

Regarding constituents subject to treatment, the Agency carefully considered the approach proposed by this commenter (limiting treatment to BDAT constituets for soil contaminated by listed hazardous waste). After consideration of other comments, however, the Agency was pursuaded that, since contamianted soil may be contaminated by a wide range of hazardous constituents, the *Chemical Waste* opinion requires treatment of al underlying hazardous constituents. See *Chemical Waste Management v. USEPA*, 976 F.2d at 16 - 18 (D.C. Cir. 1992). This issue was discussed in detail in the preamble to today's final rule.

- "ACCCI commends EPA for recognizing that treatment of soil containing listed wastes presents a completely different regulatory problem from treatment of the wastes themselves in isolation.

  To avoid having to incinerate contaminated soils to meet the RCRA treatment standards for the underlying wastes, and to allow the use of innovative treatment methods, EPA has proposed more lenient treatment standards for soils mixed with hazardous wastes than for the hazardous wastes in isolation. (The test for distinguishing between the two is whether the mixture is composed predominantly of soil, and whether the waste can be separated from the soil by "simple mechanical removal processes" like skimming or sieving. 58 Fed. Reg. 48123).

  Those more lenient standards start with the treatment standard for the waste itself - for example, 10 ppm for benzene - and then adjust it upwards. EPA asks for comment on three separate treatment alternatives for soils contaminated with organic materials:

  - 90% of the hazardous waste "constituents" must be removed from the soil and the final residue levels in the soil cannot be more than one order of magnitude higher than is allowed when treating the waste in its pure form. (However, 90% treatment would not be required to the extent it produced residue levels below those required for the waste itself.)

  - Only the second half of the first approach would apply. There would be no percentage removal requirement, but the final residue levels in the soil could not be more than one order of magnitude higher than is allowed when treating the waste in its pure form.

  - The third alternative is the converse of the second. There would be no "cap," but 90% removal would be required unless that would exceed the treatment levels for the waste itself.

  ACCCI favors the second of these approaches, which would in effect "cap" the levels of contamination allowed in soils. An approach that sets a single acceptable treatment level, and avoids "percent reduction" requirements, is most likely to result in cost-effective cleanups. Under a "percent reduction" approach, 90% reduction could be required for soils that were so slightly contaminated that they presented little environmental risk. Indeed, under a percent reduction approach, the contamination levels in soil that had been through the required treatment would vary widely from one soil to the next, depending only on the starting levels of contamination. An approach like percent reduction that automatically leads to wasted resources and unequal treatment in site clean-ups cannot be defended.

EPA's own data show that adoption of a ceiling plus a 90% treatment requirement only increases by 4% (from 65% to 69%) the amount of contaminated soil for which non-incineration technology can be used, while a "ceiling" alone allows 91% use of non-incineration technology. 58 Fed. Reg. 48,125-26. Clearly only the second approach carries out EPA's intention to reduce the need for soil incineration.

An approach that "caps" the amount of contaminant allowed in soils directly addresses the potential of that soil to contribute to environmental risk. This represents a far more effective approach than "percent reduction." In those isolated cases where the "cap" levels might not be adequate, other legal provisions provide more than enough authority for EPA to take action targeted at environmental risk directly. This is far more efficient and just approach than requiring treatment whether or not there is an environmental need for it." (ACCCI, CS2P-00031)

Response: EPA appreciates the support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA notes that the option being finalized today, 90% capped by 10xUTS, incorporates the recommendation of this commenter (use of the 10xUTS standard).

- "El Paso is a major interstate gas transmission company with operations in Texas, Oklahoma, Arizona, New Mexico, and Colorado. El Paso requests clarification of the treatment standards to be applicable to hazardous soils under this proposed rulemaking. The preamble of the proposed rulemaking provides contradictory information regarding treatment standards for hazardous soils.....

‘Section II E (“Summary of Proposed Rule/Soil Contaminated with Hazardous Waste”) of the preamble of this proposed rulemaking states that “In order to comply with the LDRs, hazardous soil would have to be treated either to meet the standards for the hazardous waste contaminating the soil, or the alternative treatment standards proposed in this notice.’ This statement is found in the third column of page 48096 of the preamble. El Paso believes this statement would provide the flexibility to treat hazardous soils to either the treatment standards listed in the table “Treatment Standards for Hazardous Wastes” starting on page 48160 of this proposed rule or the soil treatment standards proposed by this rulemaking.

Section VII G (“Treatment Standards for Hazardous Soils/Relationship to Other Regulations and Programs”) of the preamble of this proposed rulemaking states “Thus, when today’s proposed soil treatment standards are promulgated, hazardous soil will become subject to those standards in lieu of the treatment standards for the RCRA wastes contaminating the soil.” This statement is found in the first column of page 48131 of the preamble. El Paso believes this statement limits treatment of hazardous soils only to the soil treatment standards proposed by this rulemaking in direct contradiction to the statement in Section II E noted in the above paragraph.” (El Paso Natural Gas Company, CS2P-00037)

- “Second, El Paso recommends that EPA rewrite paragraph 268.47 of the rule to allow for the option of treating hazardous soil using the hazardous waste treatment standards. El Paso believes that paragraph 268.47 as written in this proposed rule would only allow treating hazardous soil to the soil treatment standards proposed by this rulemaking.” (El Paso Natural Gas Company, CS2P-00037)

Response: EPA agrees that generators should have the option of treating contaminated soil subject to LDRs to either, the soil treatment standards or the treatment standards promulgated for the contaminating waste. This issue was clarified in today’s final regulations.

- “Exxon believes that the proposed changes to the Land Disposal Restrictions (LDR) program will have a significant new cost impact on the management of existing hazardous wastes. The proposed treatment standards for newly identified and listed hazardous wastes and soils also appear overly stringent and may, in many cases, go well beyond the “minimize threat” statutory requirement in setting LDR standards.” (Exxon Company, U.S.A., CS2P-00041)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as “90% capped by 10xUTS.” EPA is finalizing the 90% capped by 10xUTS treatment standard in today’s final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

As discussed in detail in the preamble to today's proposal. EPA does not, at this time, believe that the technology-based soil treatment standards are overly stringent. The Agency notes that, in situations were treatment to the technology-based standard would result in constituent concentrations lower than those necessary to minimize threats, the Agency has provided for a site-specific, risk-based treatment variance.

- "Of the three proposed approaches for establishing treatment standards for hazardous soils, BFI believes that the option which requires treatment to a "range of standards with a ceiling one order of magnitude above the universal standard" provides the best combination of treatment and practicality. Establishing a range of standards with a "ceiling" one order of magnitude above the universal standard independent from a percentage treatment basis is preferable due to the complications that arise when calculating a percentage level. The 90 percent treatment requirements in the first and third options create the possibility for confusion when reviewing multiple data points. Low levels of contamination in soils, if addressed by the first option will be cleaned-up less than ceiling levels, negating the intent to recognize soils as a different regulatory concern since UTS will be met. A set ceiling level will clearly establish the standard and ease compliance decisions by industry while making the program easier to administer for the Agency." (BFI, CS2P-00046)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that the approach promulgated today incorporates this commenter suggestion (capping treatment at 10xUTS).

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "EPA is proposing a number of initiatives for managing contaminated soils. Laidlaw believes that the option that affords the greatest level of protection is to require soil to be treated to the universal treatment standard (UTS) plus 90 percent treatment of hazardous constituents. The UTS standard is required to insure that high levels of hazardous constituents are not land disposed. Laidlaw agrees with EPA's proposal to allow a multiple of up to 10 times the UTS standard, **if** a treatment variance procedure is established that demonstrates that the alternative standard is justified. The justification would have to be based on the current criteria contained in 268.44, namely that "the physical and chemical properties of the waste differs significantly from waste analyzed in developing the treatment standard." Laidlaw is concerned, however, with the fact that management of contaminated soils is being addressed under several different auspices within EPA, including HWIR and Superfund, each with its own timetable and agenda. In order not to confuse the regulated community, **it is imperative** that the final rule which results from this proposal is consistent with approaches taken by HWIR and Superfund." (Laidlaw Environmental Services Inc., CS2P-00050)

Response: In response to comments such as these, EPA deferred a final decision on soil treatment standards to the HWIR-Media rulemaking process. On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA is not persuaded that a treatment variance is necessary to take advantage of the 10xUTS component of the soil treatment standards. As discussed in detail in the preamble to today's final rule, the Agency has found that the soil treatment standards adequately minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by contaminated soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed. (In addition, for soils contaminated with metals, EPA believes on a purely technical basis that higher standards are needed if contaminated soils are to have a standard which is consistently achievable.)

- "The EPA is proposing to apply different treatment standards to soils that are applied to listed wastes. As discussed in Comment Number 5, the performance of the HT-6 process is achieved irrespective of whether the waste is in a soil or sludge/liquid matrix. Therefore, modified treatment standards for soil are neither justifiable nor sufficiently protective of human health and the environment. STS urges EPA to develop LDR standards for soils as the EPA has done so for listed wastes, i.e. establish

BDAT in accordance with the established procedures." (Seaview Thermal Systems, CS2P-00058)

Response: EPA has long believed that the distinct treatability issues posed by contaminated soils in addition to the distinct policy issues posed by the remedial context under which most contaminated soil is managed warrant tailored soil treatment standards. This issue was discussed in detail in the preamble to the LDR Phase 2 proposal, the HWIR-Media proposal, and numerous other EPA proposals and guidance documents. See, e.g., sources cited in the HWIR-Media proposal.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "The HWTC supports the issuance of these treatment standards, and generally supports the proposed levels.

  The HWTC supports the alternative of UTS and a requirement of 90% treatment, <u>but with a proviso</u> to allow up to UTS x 10. The variance would be administered at the local level, such as the on-scene coordinator and would need to demonstrate that UTS x 1 cannot be met with a well-designed and well-operated BDAT unit, but that UTS x 10 can consistently be met." (HWTC, CS2P-00060)

- "EPA presents three different options for setting BDAT treatment standards for contaminated soils. The option that affords the greatest level of protection is to require that soil be treated to the universal treatment standards (UTS) plus 90% treatment of hazardous constituents. The UTS standard is needed to ensure the high levels of hazardous constituents are not land disposed.

  The HWTC agrees with EPA's proposal to allow a multiple of 10 times the UTS standards, but <u>only</u> if a treatment variance procedure is established that demonstrates that the alternative standard is justified. The treatment variance procedure should be different from that in place today, which requires petitioning of Washington headquarters. Instead, a variance protocol should be developed which allows the petitioner to work with the on-scene coordinator, or state official, and objectively justifies the alternative 10 times UTS standard on the basis of criteria in 268.44, namely that "the physical and chemical properties of the waste differs significantly from waste analyzed in developing the treatment standards." The criteria should include an evaluation of the soil characteristics that prevent it from being treated to the UTS standard. Without the need to go through EPA Washington Headquarters, this variance requirement can be justified in an efficient time frame, and not significantly delay remediation.

To demonstrate that a treatment variance is warranted, the petitioner should be required to provide a test of a well-designed and well-operated BDAT unit applied to the contaminated soil. Data should be provided to demonstrated that the BDAT unit was well-designed and well-operated in accordance with its relevant permit and regulatory requirements. A minimum of eight representative samples of the treated soil should be analyzed, demonstrating that the standard of UTS plus 90% treatment of hazardous constituents cannot be met, but that UTS x 10 can consistently be met. The 90% reduction criteria is only sufficient if treatment already achieves 10 times the UTS.

A firm treatability variance procedure is needed since often the performance of innovative technologies can be improved by simply adding more steps to the process of increasing residence time. This is true of soil washing, chemical extraction and thermal desorption technologies (see attached ENSR Report). If improved treatment results can be achieved by optimizing conditions, no variance or 10 x UTS is justified. The remedial contractor must be held accountable to prove that a level of 10 x UTS is justified.

Finally, spill residues must be subject to the same BDAT standards that apply to process waste, since sham spilling of waste could be performed in order to justify relaxed treatment requirements." (Hazardous Waste Treatment Council, CS2P-00060)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the 90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA is not persuaded that a treatment variance should be necessary in order to take advantage of the 10xUTS component of the soil treatment standards. As discussed in detail in the preamble to today's proposal, EPA has found that the soil treatment standards minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by contaminated soil and the distinct policy issues raised by the remediation context under which most contaminated soil is managed.

Regarding spill residues, the Agency agrees that any intentional spilling (or mixing) of hazardous waste with soil for the purposes of circumventing applicable LDR treatment standards, is already impermissible dilution, and subjects the violator to significant fines and penalties, as well as requiring treatment to the standard for the waste that is deliberately mixed for the impermissible purpose (see 268.40 (c)). However, the Agency cautions that not every spill is impermissible dilution. Indeed, the great majority of them are not, since the activity is inadvertent, and essentially unavoidable. Since spills comprise the typical means by which soil becomes contaminated, any general assertion that spills are invariably a form of impermissible dilution would essentially mean that there are no separate treatment standards for contaminated soils. Such a result would defeat the needed result of this rulemaking: to provide distinct standards for soils that reflect both the need to treat contaminated soils and to remediate contaminated sites. Thus, only the limited class of intentional mixing of soil with non-soil for the purpose of avoiding LDR treatment standards would be impermissible dilution. This is consistent with the approach the Agency took to contamination of debris. See 57 FR at 37224 (August 18, 1992).

- "EPA presents three different options for setting BDAT treatment standards for contaminated soils. The option that affords the greatest level of protection is to require that soil be treated to the universal treatment standards (UTS) plus 90% treatment of hazardous constituents. The UTS standard is needed to ensure that high levels of hazardous constituents are not land disposed.

  The HWTC agrees with EPA's proposal to allow a multiple of 10 times the UTS standards, but <u>only</u> if a treatment variance procedure is established that demonstrates that the alternative standard is justified. The treatment variance procedure should be different from that in place today, which requires petitioning of Washington Headquarters. Instead, a variance protocol should be developed which allows the petitioner to work with the on-scene coordinator, or state official, and objectively justifies the alternative 10 times UTS standard on the basis of criteria in 268.44, namely that "the physical and chemical properties of the waste differs significantly from waste analyzed in developing the treatment standards." The criteria should include an evaluation of the soil characteristics that prevent it from being treated to the UTS standard. Without the need to go through EPA Washington Headquarters, this variance requirement can be justified in an efficient time frame, and not significantly delay remediation.

  To demonstrate that a treatment variance is warranted, the petitioner should be required to provide a test of a well-designed and well-operated BDAT unit applied to the contaminated soil. Data should be provided to demonstrate that the BDAT unit was well-designed and well-operated in accordance with its relevant permit and regulatory requirements. A minimum of eight representative samples of the treated soil should be analyzed, demonstrating that the standard of UTS plus 90% treatment of hazardous constituents cannot be met, but that UTS x 10 can consistently be met. The 90% reduction criteria is only sufficient if treatment already achieves 10 times the UTS.

A firm treatability variance procedure is needed since often the performance of innovative technologies can be improved by simply adding more steps to the process or increasing residence time. This is true of soil washing, chemical extraction and thermal desorption technologies (see attached ENSR Report). If improved treatment results can be achieved by optimizing conditions, no variance or 10X UTS is justified. The remedial contractor must be held accountable to prove that a level of 10X UTS is justified..

Finally, spill residues must be subject to the same BDAT standards that apply to process waste, since sham spilling of waste could be performed in order to justify relaxed treatment requirements." (Hazardous Waste Treatment Council, CS2P-00060)

- "EPA should not rely on the UTS as "baseline" treatment standards for contaminated media. The UTS are derived from treatability data for particular process wastes, and do not necessarily reflect the levels achievable with hazardous media. Moreover, as discussed above, EPA should examine valid soil treatability data, including alternative and innovative technologies, and cap the resultant technology-based standards with an analysis of the risks presented by hazardous media. This is far more preferable than mechanically transferring treatment data from process wastes – with some sort of "fudge factor" – to the very different world of remedial wastes. If EPA has insufficient data to set standards this way, then perhaps it can continue to rely on the levels in CERCLA LDR Guidance 6A levels, or it could specify treatment by innovative technologies wherein analysis of the treated soil would be unnecessary, an approach similar to the one the Agency followed with contaminated debris. Just as Subtitle C should not apply to hazardous media, treatability data for process wastes should not be blindly used to establish treatment standards for hazardous soils.

  Furthermore, EPA's "order of magnitude" approach will not encourage the use of innovative technologies, as EPA desires, because it appears that many of these technologies will not be able to achieve the proposed standards in a cost-effective manner. The studies cited by EPA are, for the most part, pilot or bench scale studies, and these treatment technologies have not been applied to treat large volumes of hazardous media in full-scale trials." (General Electric Company, CS2P-00076)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA notes that data examined by the Agency shows that contaminated soils can routinely be treated by non-combustion technologies to meet the soil treatment standards promulgated today. This issue is discussed in detail in the preamble to today's final rule. Furthermore, the Agency has, as this commenter suggested provided a site-specific, risk-based treatment variance to all the technology-based soil treatment standards to be capped, on a site-specific basis, if higher concentrations are shown to minimize short- and long-term threats to human health and the environment.

- "SOCMA applauds EPA's understanding of the compelling need to develop LDRs for hazardous soil in order to alleviate the problems caused by the current requirement to treat soils to meet the LDRs for listed wastes "contained-in" those soils. On the other hand, the current proposal builds upon the technology-based universal standards and thus continues to build upon the inconsistencies noted above.

  While SOCMA expects to address this issue in greater detail in light of further developments under HWIR, at this stage SOCMA urges the Agency to pursue the development of appropriate risk-based standards for soil, both with respect to LDRs and exemption levels. At present, significant resources are devoted to efforts to meet unrealistic treatment standards which are not based on risk.

  SOCMA notes that EPA did an excellent job in the proposed July 27, 1990, corrective action rule when developing risk-based standards for many of the same chemicals listed in this proposal. The procedures used to develop the levels in the corrective action proposal have been reviewed by EPA's Science Advisory Board (SAB) which found them to be well researched and documented. The result was the establishment of <u>realistic</u> risk-based goals. The difference between the corrective action levels and the proposed universal standards is due to the differing methods used to establish the levels.

  Again, SOCMA believes that risk-based levels provide the greatest overall protection of human health and the environment in the most cost effective manner, while technology-based levels result in requiring treatment of contaminated materials to meet levels that have no correlation with risk. Neither SOCMA member companies nor the economy at large can bear this misallocation of resources. This problem can be resolved by coordinating both LDR and HWIR exemption levels and by relying upon realistic assessments of risk." (Synthetic Organic Chemical Manufacturers, CS2P-00085)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

Regarding the suggestion that EPA develop LDR treatment standards for contaminated soil based on risk, EPA agrees that generally risk-based LDR treatment standards would be preferable to technology-based standards. However, the Agency has, to date, been unable to develop risk-based standards that could be applied at a national level, largely because of the wide variety of site-specific physical and chemical compositions encountered in the field and the uncertainties involved in evaluating long-term threats to humans and the environment prosed by land disposal. In order to reduce the likelihood that technology-based treatment standards will result in treatment beyond the point at which threats are minimized, the Agency has provided an opportunity for a site-specific, risk based treatment variance which could be used to cap the technology-based standards. The site-specific risk-based treatment variance is discussed in detail in the preamble to today's final rule.

- "Of the three Technology-Based Treatment Options presented, we strongly favor Option #1 … "a range of standard with a ceiling one order of magnitude greater than the Universal Treatment Standard provided 90% treatment of each constituent subject to treatment is achieved."

  We strongly believe, however, that with the availability of an economical process capable of reducing the retained mercury content in treated soils to less than 2 ppm regardless of the type of soil being treated or the form of the contained mercury, that the TCLP-based standard in Option 1 does not reflect the available technology and propose that the standard should be lowered further and based upon a residual contained mercury content after treatment of 2 ppm or less. This will (a) assure maximum mercury removal at each contaminated site, (b) prevent the accumulation of mercury-containing wastes that are classified as nonhazardous but which still contain leachable quantities of mercury, and (c) put an end to the liability inherent in disposal of treated wastes with residual mercury contents greater than 2 ppm." (Mercury

Recovery Services CS2P-00086)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA is not, at this time, persuaded that a special standard is needed for mercury contaminated soils, since the Agency has found that the 90% capped by 10xUTS standard minimizes threats to human health and the environment considering the distinct treatability issues posed by contaminated soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed.

- "The proposed rule states that if the final exemption levels are at or above the LDR treatment standards and represented minimized threat levels, the treatment standards would be capped at the final exemption level. The proposed rule does not explain what procedure will be used to decide if the exemption level also represents the minimized threat level. Will authorized States be able to make this decision? If so, how will national consistency be maintained?" (Association of State and Territorial Solid Waste Management Official, CS2P-00091)

Response: EPA is not, at this time, taking action on the portions of the LDR Phase 2 proposal which would have codified the contained-in policy. If, in the future, EPA takes such action, it will respond to comments on the relationship of contained-in determination to LDR treatment standards, as necessary, at that time.

- "U.S. EPA is proposing three treatment standard options for soil. The proposed treatment standards for soil would be ten times the universal treatment standard or ninety percent reduction in the concentration of the constituent or a combination of both of these. These requirements seem very arbitrary. How can the U.S. EPA show that these values represent the "minimized threat level"? The treatment standards for soil should be based on health-based risk values.

  Two of the options for treatment standards for soil require that there be a 90% reduction in the constituent by treating the waste. The proposed rule suggestions that the generator document the 90% treatment of the constituent by measuring the initial concentration and the concentration of the constituent. This will present an enforcement problem because constituent concentrations will vary over the area being remediated. As written, it would seem that the generator would need to demonstrate that 90% reduction occurred to the sample with the lowest concentration. It may be more appropriate to require the 90% reduction on an average concentration of the area being remediated rather than for each sample." (Association of State and Territorial Solid Waste Management Official, CS2P-00091)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

As discussed in detail in the preamble to today's final rule, EPA has found that the soil treatment standards minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed. The standards also fall within the zone of reasonable values the Agency could have selected as reflecting performance of treatment technologies (other than combustion).

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the 90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

Regarding measuring compliance with the 90% reduction standard, the Agency has clarified in the preamble to today's final rule that the reduction should be measures after characterizing any given volume of soil using normal site characterization techniques. It is not necessary to measure the 90% reduction from the sample value with the lowest constituent concentrations.

- "One of the proposed criteria is that the soil not exceed a 10^{-4} to 10^{-6} risk level. It should be specified whether this risk is determined considering residential or industrial use. A provision should be included that if the contained-in determination is made considering industrial use, then the soil would need to be reevaluated for the purposes of further hazardous waste management if the land use changes. The proposed rule is not clear how interstate regulation of wastes will be handled. For on-site disposal, maintaining flexibility for the State overseeing the remediation is very important and establishing specific criteria is less important.

  Currently, and according to the procedures on page 48127-48128, the Regional Administrator or an authorized State determines whether hazardous waste is contained in soil by use of characteristics tests and site-specific risk-based assessment. Once a determination is made that hazardous waste is not contained in the soil, Subtitle C no longer applies to the soil, and it could even be land disposed elsewhere in a non-LDR landfill. Some of the risk-based levels which are now used, particularly at remote locations, are substantially higher than the technology-based LDR soil treatment levels which would allow treated soil to go to a MTR landfill. Therefore, if soil which is to be placed in a specific site is not subject to LDR because of a site-specific assessment, perhaps the site should have a deed restriction to prevent soil which is above the LDR soil-treatment standard from being removed from the site unless it goes to an MTR landfill." (Association of State and Territorial Solid Waste Management Officials, CS2P-00091)

Response: EPA is not, at this time, taking action on the portion of the LDR Phase 2 proposal which would have codified the so called "contained-in" policy. Although the policy is not codified, EPA regions and authorized states may continue to implement the contained-in policy, as appropriate, on a site-specific basis using Agency guidance. EPA's latest guidance on implementation of the contained-in policy is discussed in detail in the preamble to today's final rule.

If, in the future, EPA decides to take action to codify the contained-in policy, it will respond to these comments, as necessary, at that time.

EPA notes that the 10(-4) to 10(-6) risk range is used in today's final rule to define the range of appropriate levels for alternative, risk-based, LDR treatment standards for soil, when such standards are approved through a site-specific, risk-based minimize threat variance. EPA has clarified that the 10(-4) to 10(-6) risk levels should be calculated using a reasonable maximum exposure scenario. This exposure scenario could be residential or industrial, depending on site-specific circumstances.

- "What is the basis for authorizing standards one order of magnitude (or more if only 90% treatment approach is chosen) above the universal standards for soil treatment? Who determines whether and which of the alternative treatment standards should apply for soil treatment?" (ASTSWMO, CS2P-00091)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

As discussed in detail in the preamble to today's final rule, EPA has found that the soil treatment standards minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA notes that, in their comments on the HWIR-Media proposal, the Association of State and Territorial Solid Waste Management Officials strongly suggested that EPA exempt all contaminated soil from a duty to comply with any RCRA requirement provided the soil was managed as part of a state overseen remedial action. Given these comments, the Agency can only assume that ASTSWMO's concerns about the protectiveness of the soil treatment standards have been resolved.

■ "The Universal Treatment Standards also are an improvement which makes the LDR system more rational and should stimulate innovations in waste management." (Association of State and Territorial Solid Waste Management Officials, CS2P-00091)

Response: The Agency appreciates this support of the Universal Treatment Standards.

■ "The Agency has proposed three alternatives for developing technology-based treatment standards for hazardous soils:

a. A range of standards with a "ceiling" one order of magnitude above the Universal Standard, provided 90% treatment of each constituent is achieved.
b. A range of standards with a "ceiling" one order of magnitude above the universal standards; the efficiency (%) of treatment required would be that sufficient to achieve the "ceiling" standard (or less) for each constituent.
c. Achieving 90% treatment for each constituent <u>or</u> by achieving treatment to the universal treatment standard.

GM sees merit in the approach of a "ceiling" one order of magnitude above the universal standards to attempt to optimize technology and reduce hazardous constituents to levels at which environmental efficiencies threats are appropriately minimized. However, treatment efficiencies of 90% or greater are not always justified, and in many instances would force treaters to use incineration as the only possible treatment method.

GM supports **a modification of** Alternative 3: i.e., Achieving 90% treatment for each constituent <u>or</u> the "ceiling" standard set at tone order of magnitude greater than the universal standard, **<u>whichever is greater</u>**. This alternative would be sufficiently protective of human health and the environment, and would also encourage the development of new and innovative technologies to provide safer, more-cost-effective, and more publicly accepted methods (i.e., incineration has a very bad public image)for treating remediation-related wastes. (General Motors, CS2P-00095)

Response: EPA appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that this is consistent with the approach recommended by the commenter.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "We favor Option #2 (a range of standards with a "ceiling" one order of magnitude above the UTS. However 90% reduction is not required) as the best approach to achieving flexibility in removing and recovering lead from soils while minimizing danger to the environment." (PMET-00096)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that this approach is consistent with the recommendation of the commenter, in that treatment is only required to 10xUTS (although treatment to 90% is also allowed, even if it yields constituent concentrations greater than 10xUTS).

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "We believe the UTS proposal to be an unnecessary extension of the Land Disposal Restriction (LDR) treatment standards previously developed that will cause waste generators and TSD facilities significant compliance costs. This belief is based on our experience as a treater/disposer of metal-bearing wastes and hazardous soils and our understanding of the process EPA followed in establishing the waste-specific treatment standards currently in place....

EPA is proposing to establish a set of treatment standards based on the UTS for hazardous soils[2]. The need for soil LDR standards is based on the perception that soils are often more difficult to treat than wastes and that the BDAT treatment technologies used as the basis for the waste-specific standards may not be able to achieve the standards in soils contaminated with those wastes. Three different sets of standards are proposed, all of which are based to some extent on the UTS. Of these, we favor the one that allows land disposal provided the soil constituents are within one order of magnitude of the concentrations listed in the UTS table. However, for the same reasons that are itemized above for the UTS proposal, we do not support the use of the UTS as the basis for determining when hazardous soils may be land disposed. Presuming that soils are more difficult to treat than the wastes that contaminate them, we would propose a treatment standard established at some reasonable multiplier above the waste-specific standard." (Mill Service Inc., CS2P-00098)

Response: The universal treatment standards are not the subject of today's rulemaking.

- "Of the three approaches to hazardous soils, Heritage prefers the universal treatment standard plus one order of magnitude, without any specified percentage efficiency treatment requirement." (Heritage Environmental Services Inc., CS2P-00103)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that this approach is consistent with the commenter's recommendation in that treatment will not be required to below 10xUTS.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "The Bureau supports the Agency's commitment to the increased use of innovative technologies however, the requirement that untreated contaminated soil be treated to within one order of magnitude of the universal standard, provided a 90% reduction in the constituent concentration occurs, will result in untreated low level contaminated soil receiving treatment to a lower concentration (near the universal standard) than highly contaminated untreated soil. Additionally, the 90% reduction requirement may not reduce highly contaminated waste to levels at which threats are minimized. One significant omission from the Docket is the assurance that the proposed one order of environmental health threat to an acceptable level. One suggested approach to providing that assurance would be the comparison of health-based concentrations to the proposed "range" for each constituent.

The Bureau agrees that this option would increase the number and type of innovative technologies capable of achieving the treatment standards and would simplify compliance with rule. This option may have a significant drawback, in that, untreated, low level contaminated soils may have high enough total concentrations to fail TCLP, yet low enough concentrations that the contaminated soil falls within the one order of magnitude "range". The results may be the avoidance of any treatment requirements and the disposal of hazardous waste in a manner inconsistent with the regulations (i.e., land disposal of hazardous waste.

Again, the Bureau supports the Agency's commitment to the increased use of innovative technologies, however, the 90% reduction requirement may not reduce highly contaminated waste to levels at which the threat to human health and the environment are minimized to an acceptable degree. Also, this option may result in treated soils which would fail TCLP but due to achievement of the 90% reduction may be disposed of in a manner inconsistent with the hazardous waste management regulations." (State Of New Mexico Environment Department, CS2P-00108)

Response: The Agency appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

As discussed in detail in the preamble to today's final rule, EPA has found that the 90% capped by 10xUTS treatment standards minimize threats as required by RCRA Section 3004(m) considering the distinct treatability issues posed by contaminated soil and the distinct policy issues raised by the remediation context under which most contaminated soil is managed. The Agency notes that, in the case raised by the commenter, of hazardous contaminated soil which was treated to today's soil treatment standards but, nonetheless, continued to fail the toxicity characteristic leaching procedure test, disposal of that soil in a RCRA Subtitle C unit would be required.

- "I believe that a technology based treatment standard may become a "loophole" for individuals who are not committed to minimizing the impact to the environment or to the public from their contaminated soil.

  However, presenting "achievable limits" as the treatment standards is very encouraging. This concept allows generators or site owners to select from more than one technology to treat their soil and should encourage treatment." (Southwest Soil Remediation, CS2P-00109)

Response: EPA appreciates this support for tailored soil treatment standards. As discussed in detail in the preamble to today's final rule, technology-based treatment standards, such as those promulgated today, have been upheld as a permissible reading of the "minimize threat" requirement of RCRA Section 3004(m).

- "The proposed treatment methodologies present a novel approach to regulations. However, my main concern is will these levels achieve the required environmental and public protection to keep RP's from being sued in the future. RP's and contractors want a definable treatment level that is:

  - Achievable
  - Provides adequate protection to the environment and the public (Achieves TCLP)
  - Eliminates the need to dispose of the treated soil as a hazardous (RCRA, Subtitle C or D) waste, so that the soil can be used as backfill or ground cover. This may require a stepped treatment level depending on if the soil is used in an industrial or residential area.

  Thermal desorption is capable of remediating soils containing high contaminant concentrations. Incineration is not always required.

  Of the three treatment standards, the 90% treatment level is the least acceptable from an public safety and environmental protection point of view. Merely removing 90% of the contaminant does not take into consideration how toxic the contaminant is or how much is there. For example. If 10,000 lbs of diesel fuel are spilled onto 10 tons of soil (333,000 ppm or 33% diesel), removing 90% of the diesel leaves 33,000 ppm in the soil (3%), which is much higher than most contaminant levels at UST sites (except for directly below a leak).

Of the remaining two scenarios, scenario #2 is the least confusing and easiest to confirm. By setting the treatment standard at 10 times above the universal standard provides a fixed number that must be achieved. This should reduce the potential for fraud, and allows lightly contaminated soils to be treated to a lesser extent.

Scenario one (to 10 times universal standard, given a 90% min. removal or to the universal standard: is very confusing, especially when treating lightly contaminated soils. What happens when you have 76 ppm for PCP (universal level = 7.4 ppm)? Must it be reduced by 90% to 7.5 ppm? What about if the concentration was at 73 ppm, must it be reduced to 7.4 ppm (89.9% removal).

These illustrations present arguments that either RP's, contractors or zealous environmentalists may present to force more or less treatment.

The treatment standard should be clearly defined, and soils containing concentrations lower than this value should not be classified as hazardous wastes whether they were originally lightly contaminated or treated soil. Too many variations will increase the legal battles over what the soil treatment requirements are. I believe that the overall goal of these regulations is to simplify the remediation of contaminated soils while protecting human health and improve environmental quality." (Southwest Soil Remediation, CS2P-00109) [Also see Chapter 27.A.]

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

As discussed in detail in the preamble to today's final rule, EPA has found that the soil treatment standards promulgated today "minimize threats" within the meaning of RCRA Section 3004(m) considering the distinct treatability issues associated with contaminated soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed. In the unusual instance that clear risks remained after achieving the treatment standard, the Agency or authorized States retain authority under other remedial provisions (RCRA corrective action, CERCLA, for example) to insure that needed treatment occurs.

Regarding the disposal of treated soil, such soil would, if it contained hazardous waste or exhibited a characteristic of hazardous waste, remain subject to RCRA Subtitle C regulations and require disposal in a RCRA Subtitle C facility.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option.

Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

Finally, EPA notes and agrees with the commenter's statement that thermal desorbtion is capable of treating soils with high concentrations of organics and that incineration would not ne necessary.

- "As stated above, any treatment standards should be capped with risk based endpoints. This is especially true for contaminated soil, which is a complex and difficult matrix to treat. By basing treatment standards on the results of incineration, or even results of incineration multiplied by ten, EPA will not significantly reduce the amount of soil that will be incinerated, or increase the amount of soil that will be treated by alternative technologies. More importantly, the proposed UTS levels are often far below "minimize threat" levels and therefore result in unnecessary treatment. MMA and EMA can again be used to demonstrate that the proposed UTS* 10 treatment levels are far too low, and the proposed UTS * 10 modified by a 90% treatment requirement

  option merely exacerbates the problem when it results in treatment to levels below even the UTS.

  The proposed UTS level for MMA and EMA in non waste waters is 160 mg/kg, and for all three proposed hazardous soil options, the highest UTS limit is no more that 1600mg/kg of MMA or EMA. As stated above, the currently published EPA Reference Dose for MMA is 5.3 mg/day and for EMA is 6.0 mg/day. To calculate potential human intake of contaminated soil, the EPA typically assumes ingestion of 200 mg of soil per day.[15] At this rate, intake of 1600 mg/kg MMA-contaminated soil results in only 0.32 mg/day for a 70 kg adult, approximately <u>17 times greater</u> than the dose derived from the UTS limit of 1600 mg/kg.

  Stated another way, the concentration of MMA or EMA in soil could be well above the proposed UTS before exceeding the Rfd. Assuming an intake of 200 mg/day of contaminated soil, a 15 kg child could eat soil contaminated to 5,625 mg/kg of MMA, and a 70 kg adult could eat soil contaminated to 26,250 mg/kg of MMA, each day without adverse health effects. Again this is <u>3.5 to 16.5 times greater</u> than the UTS limit of 1600 mg/kg.

  Moreover, a soil metabolism study has shown that MMA will degrade rapidly (ie., half-life less than one day) in soil indicating that MMA and similar methacrylates such as MMA and EMA will not accumulate after reaching soil.

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[15] EPA (1989) Exposure Factors Handbook, Office of Health and Environmental Assessment, U.S. Environmental Protection Agency, Washington, DC, EPA/600/8-89/043, May 1989.

Based on the current EPA Rfd, soil concentrations of MMA or EMA which are substantially higher than the proposed UTS limits would not be associated with unreasonable health risk from dietary exposure through soil ingestion. The UTS-based limits are considerably lower than necessary to protect human health, and would require an excessive degree of soil treatment." (Rohm and Haas Company, CS2P-00114)

Response: Consistent with this commenter's suggestion EPA has, in today's final rule, provided an opportunity for site-specific, risk-based cleanup levels to cap the technology-based LDR treatment standards provided such site-specific, risk-based levels are found to minimize short- and long-term threats to human health and the environment and are approved through a LDR treatment variance.

- "Does EPA intend to include the three alternative treatment standards for hazardous soil in the final rule, or will only one alternative be selected?

  Westinghouse supports the Agency's proposal to provide alternative treatment standards for hazardous soil. In many cases, hazardous soils can not be treated to existing LDR treatment standards. This situation has resulted in the increased use of in-situ treatment techniques to preclude invoking LDR even if a more efficient, and in some cases more cost-effective ex-situ method is available. Providing a less stringent treatment alternative will provide flexibility to use more effective treatment technologies, and will also in many cases expedite remedial actions.

  Based on our reading of the proposed rule preamble, however, it is not clear whether the Agency plans to make all three proposed alternatives available or whether only one will be selected for final promulgation. Proposed language for 40 CFR 268.47 makes it appear that EPA will be promulgating all three The Agency should clarify its intent.

  In the event only one of the alternatives is selected, Westinghouse believes the second option is the most technically sound. This option requires that one achieve a ceiling concentration of one order of magnitude above the UTS irrespective of treatment efficiency, and would provide the greatest treatment flexibility while limiting threats to the environment. This approach is the most straight forward, and will simplify development and operation of treatment processes and disposal decision-making. We recognize that there would be instances where a soil could not be treated to this level due to high initial concentrations, which could result in the need to pursue more aggressive treatments such as incineration. However, we believe this drawback is outweighed by the benefits of this approach over the other alternatives.

  Selecting the first option would also provide a ceiling one order of magnitude greater than the UTS, but would additionally require a 90 percent treatment efficiency. If this alternative were selected, situations would arise where the initial concentration of a constituent was slightly above the ceiling concentration, requiring that it be reduced by 90 percent. If this efficiency could not be achieved, the soil would be subject to the base UTS concentration which also could not be met, leaving as the only alternative a site-specific treatability variance.

The third option would require a 90 percent treatment efficiency without a concentration ceiling. While appealing for most scenarios, as EPA states in the preamble, allowing this option for highly contaminated wastes could result in the land disposal of high levels of toxic constituents. In our view, it is preferable to require more severe treatment of these wastes to meet a concentration limit than to allow the disposal of such materials without additional criteria specified for assessing risk.

Another approach that EPA might want to consider is a combination of Options 2 and 3 where you have the choice between the 90% remediation or the ceiling value. This approach would encourage more cost-effective treatment and promote development of other remedial treatment technologies." (Westinghouse Electric Corp., CS2P-00115)

Response: EPA appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The Agency notes that the option selected, 90% capped by 10xUTS, is consistent with the commenter's recommendation.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "Hughes supports EPA's efforts to develop universal treatment standards for hazardous soils in order to encourage flexibility and a wide range of remediation technologies to meet Land Disposal Restrictions (LDR) while at the same time providing the regulated community with nationally consistent standards. Hughes also favors applicability of universal treatment standards to all hazardous soils regardless of the type of contaminating hazardous waste (i.e., listed hazardous wastes, soils displaying the toxicity characteristic, and soils displaying the characteristic of ignitability, corrosivity, or reactivity). However, treatment standards based solely on BDAT are neither appropriate nor cost-effective. Standards should be based on the relative risks to human health and the environment posed by the hazardous constituents of concern.

Hughes does not endorse the first option proposed by EPA for establishing universal treatment standards for hazardous soil. This option would require generators, prior to land disposal, to reduce the concentrations of regulated hazardous constituents by 90% provided that the resulting concentrations are less than or equal to ten times the new universal treatment standards. Unlike in Option 3, EPA does not explicitly address under Option 1 situations where concentrations are above the universal treatment standards but below the ceiling level. EPA should clarify under Option 1 whether generators of hazardous soils would need to reduce constituent concentrations by 90% even if this meant reduction below the universal standard or if treatment requirements would cease once the universal standard has been met, regardless of the percentage reduction achieved. As discussed below, no matter how EPA clarifies this issue, Option 1 would result in inequitable treatment requirements among the regulated community.

EPA's third option provides an unlimited range of values above the universal standards provided 90% treatment is attained (no ceiling value), unless 90% treatment would treat the waste to a level below the universal treatment standards. Under such circumstances, achieving the universal standards would be sufficient. This approach also establishes an inequitable format whereby generators would be required to achieve varying constituent levels, depending on the initial concentrations of the waste.

Options 1 and 3 would require generators of hazardous soil with comparatively low levels of hazardous constituents to reduce constituent levels, by meeting the 90% reduction requirement, to levels below those required to be met by generators of hazardous soil with comparatively high levels of hazardous constituents. Generator A, with low levels of hazardous constituents in the soil, could be required to treat the soil to the universal standard while Generator B, with initial concentrations at much higher levels, could meet the treatment requirement with constituent levels in their treated waste at concentrations greater than the initial constituent concentrations in Generator A's hazardous soil. Such inequity is unacceptable and is not justified by any imagined advantages with respect to flexibility and encouraging innovative treatment technologies.

Furthermore, these options are unnecessarily conservative with respect to hazardous soils containing hazardous constituents at concentrations just above the universal standards. Achieving a 90% reduction of hazardous constituents under such circumstances could be technically difficult as well as costly.

Hughes advocates adoption of the second approach proposed by EPA which provides a more balanced treatment standard based on health and technology considerations.

Under this approach, generators would need to reduce the concentration of hazardous constituents to ten times the universal standards without any requirements for percentage reductions in hazardous constituent concentrations. This type of approach is more consistent with risk-based derived cleanup levels which have been agreed upon by industry and regulatory agencies under CERCLA remediation and RCRA corrective action programs. EPA developed the universal treatment standard and allowable treatment range to minimize the threats to human health and the environment. Therefore, if a soil treatment technology achieves a cleanup level in this range, this objective has been met regardless of whether the treatment reduction efficiency is 20% or 90%." (Hughes, CS2P-00125)

Response: EPA appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that the option chosen is consistent with the commenter's recommendation in that, regardless of the initial concentrations of hazardous constituents in any given volume of contaminated soil, treatment is not required to levels below 10xUTS.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- **"**AAMA supports establishing the proposed alternative technology-based treatment standards for hazardous waste soils. This approach will reduce current reliance on incineration while encouraging innovative soil treatment technologies. However, AAMA is concerned with the first option proposed to establish treatment standards. Members of the Hazardous Waste Identification Rule Roundtable have found variability in the ability of the listed treatment technologies to consistently meet the 90% standards, particularly in field performance." (American Automobile Manufacturers Association, CS2P-00128)

Response: EPA appreciates the support for tailored treatment standards for contaminated soils.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "Questar generally supports development of the universal treatment standards and the hazardous soil treatment standards. This is a much needed simplification of the regulations, especially if site specific standards are not precluded where they may be warranted. Some of the treatment standards, however, seen to be unnecessarily low. Mercury for example, at 0.009 ppm, is two orders of magnitude below the level at which a material is declared hazardous. If mercury in the leachate at 0.19 ppm is not indicative of a hazardous waste, there appears to be no reason to treat to 0..009 ppm other than it is possible to effect such levels by treatment. Similarly for pentachlorophenol, where the treatment level is 7.4 ppm, yet soil would be not declared hazardous at 99 ppm in the leachate. The Agency seems to be relying on decisions made in the contaminated debris regulations which do not appear to be cost effective." (Questar Corporation, CS2P-00130)

Response: EPA appreciates the support for tailored soil treatment standards.

- "On page 48131 of the document the statement is made that "In general, the treatment standards proposed in today's rule regarding hazardous soil are higher than the existing treatment standards, and are intended to allow flexibility in determining what treatment technologies to utilize.

  The development of treatment technologies that are alternative to incineration is to be encouraged. However, treatment must be carried out to levels that have been demonstrated to be at least protective of human health. We have concerns that levels of soil contamination an order of magnitude higher after treatment, than the values given in Table UTS would not necessarily be protective of human health. For example, the BDAT standard proposed for Pentachlorophenol (PCP) for Nonwastewaters on page 48117 of the document, appears to be too high to be protective of human health. The drastically negative effects of PCP on the human body are well known (see, for example <u>Pentachlorophenol</u>. U.S. Department of Health & Human Services, Public Health Service Agency for Toxic Substances and Disease Registry. Draft for Public comment. October, 1992, hereinafter denoted as Ref.1). Also, a) PCP accumulates in tissue-i.e. single doses are not isolated in their contribution to overall effects on the human body: b) the LDR treatment standard for PCP is < 1 ppb (Ref. 1. P. 110): c) volitization of PCPs from soils can occur (the Nevada eight-hour PCP air quality standard is 1.20 $x10^2$ mg/kg) as it does from treated wood. In view of these considerations it is suggested that instead of the proposed “Maximum for any single grab sample” being 7.4 mg/kg, the standard in Table UTS for Nonwastewaters proposed for addition to 40 CFR § 268.48 be set no higher than 1.0 mg/kg.” (Department of Conservation and Natural Resources, Division of Environmental Protection, CS2P-00131)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as “90% capped by 10xUTS.” EPA is finalizing the 90% capped by 10xUTS treatment standard in today’s final rule.

As discussed in detail in the preamble to today’s final rule, EPA has found that the soil treatment standards minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by contaminated soil and the policy issues posed by the remediation context under which most contaminated soil is managed. The Agency notes that the soil treatment standards, like any LDR standard, are not intended for and should not be used as cleanup levels. The treatment standards are based on the performance of various technologies, not an assessment of risk. Treated soil, like hazardous waste treated to comply with LDR standards, remains subject to RCRA Subtitle C regulations. In addition, as noted in the preamble to the proposed rule, in the unusual situations where compliance with the technology-based standards might result in constituent concentrations that, nonetheless, exceed site-specific, risk-based cleanup levels, existing cleanup programs at the state and Federal levels would ensure that cleanup levels were achieved. (EPA does take note of this comment, however, when considering some of the adamant comments from commenters from the wood preserving industry arguing that treatment standards for soils contaminated with wood preserving wastes, of which PCP is often a constituent, should be even higher than 10x UTS or 90 % reduction.)
The basis for EPA’s April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- “As a general action procedure, option two, under which soil would be treated to a maximum containment level ten times higher than the value in Table UTS appears preferable to options 1 and 3 in that a known maximum level of soil contamination would have been reached independent and contamination or specific treatment technology.” (Department of Conservation and Natural Resources, Division of Environmental Protection, CS2P-00131)

Response: EPA appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as “90% capped by 10xUTS.” EPA is finalizing the 90% capped by 10xUTS treatment standard in today’s final rule.

The basis for EPA’s April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- “On page 48126 of the document the statement is made that “EPA solicits comment on the technical or environmental appropriateness of a 90% approach, in particular where hazardous soils are heavily contaminated with toxic constituents…”

  This approach is the third of the three options discussed. Under it, soil would be treated to remove 90% of its original contamination no matter how high the original levels of contamination were in the soil prior to treatment. This option does not appear viable since unrestricted levels of hazardous wastes in treated soils would be the likely result.” (Department of Conservation and Natural Resources, Division of Environmental Protection, CS2P-00131)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as “90% capped by 10xUTS.” EPA is finalizing the 90% capped by 10xUTS treatment standard in today’s final rule.

The Agency has found that the treatment standards minimize threats within the meaning of RCRA Section 3004(m). EPA notes that, like hazardous waste treated to meet the waste treatment standards, soil treated to meet the soil treatment standards remains subject to RCRA Subtitle C regulations.

The basis for EPA’s April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- “Uniroyal Chemical supports the use of alternative treatment standards for hazardous soils. The alternative soil treatment standards are being proposed to allow selection of treatment methods other than incineration. Uniroyal Chemical has found use of incineration technology to treat hazardous soils, unless they are significantly contaminated with organics, undesirable economically and believes that incineration of dirt is an inappropriate use of available incinerator capacity. Although risk based treatment standards are inherently more appropriate as a mechanism for minimizing damage to human health and the environment, increasing the likelihood that treatment methods other than incineration can be selected via alternative treatment standards for hazardous soils is strongly supported by Uniroyal Chemical.

Uniroyal Chemical supports the third proposed alternative treatment standard for hazardous soils; i.e., "hazardous constituent concentrations must be reduced by either 90% or to the universal treatment standard," if the Environmental Protection Agency has indeed, determined that only the three proposed alternatives can meet the requirement to minimize damage to human health and the environment. Uniroyal Chemical believes that the third alternative would allow greater flexibility in treatment method selection and also allow for treatability variations of different hazardous constituents contained in one hazardous soil. However, because the potential treatment methods may achieve 90% removal for high level contaminants, whereas the removal efficiency for low level contaminants would generally be significantly less, Uniroyal Chemical believes that an alternative treatment standard that would more likely result in treatment by means other than incineration is a combination of alternatives two and three. Specifically, Uniroyal Chemical would prefer to see the treatment standard set at "hazardous constituent concentrations must be reduced by either 90% or to ten times the universal treatment standard."

Treated hazardous soils remain a hazardous waste unless the specific waste has been delisted under 40 CFR 260.22. (In the future it may be possible to obtain a determination that the soil no longer contains hazardous constituents.) Consequently, disposal subsequent to treatment to treatment to the alternative hazardous soil treatment standards would be in a Subtitle C MTR landfill. The advances in landfill design since the advent of the MTR requirements have been significant. Uniroyal Chemical believes that treatment of hazardous soil such that "hazardous constituent concentrations are reduced by 90% or to ten times the treatment standard, " followed by disposal in a MTR landfill, would be protective of human health and the environment.

Uniroyal Chemical is concerned that the analytical requirements to evaluate the underlying hazardous constituents in hazardous soils; i.e., comparison to the Universal Treatment Standards or to the initial constituent concentrations for 90% removal efficiency, will present a serious impediment for a large quantity generator who endeavors to remove hazardous waste from his facility within 90 days as required under 40 CFR 262.43 accumulation standards. Uniroyal Chemical has eleven domestic facilities, only two of which are permitted treatment, storage, and disposal facilities.

The remaining nine facilities operate under the 40 CFR 262.34 accumulation standards. Uniroyal Chemical Company believes that less than 90-day hazardous soils on-site in order to allow selection of a treatment method other than incineration. Specifically, Uniroyal Chemical strongly recommends that the accumulation time limits should be extended to 180 days for hazardous soil management only, in order to allow appropriate alternative treatment methods to be evaluated. Hazardous soils are often generated through inadvertent spills of commercial chemical products and, as such, preplanning for treatment and disposal is difficult. Currently, under 40 CFR 262.34 (b) an extension of 30 days may be obtained on a case-by-case basis. If EPA truly wishes alternative treatment standards other than incineration for hazardous waste soils to be utilized, Uniroyal Chemical believes that 40 CFR 262.34 (b) should be modified to allow either an automatic 90 day extension or a case-by-case 90 day extension specifically for hazardous soils." (Uniroyal Chemical, CS2P-00140)

Response: EPA appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that the option being promulgated today, 90% capped by 10xUTS, is consistent with the commenter's recommendation.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

Regarding the suggestion that EPA provide an automatic extension to the 90 day accumulation time limit for hazardous soil, EPA is not, at this time, persuaded that such an extension is necessary. The Agency will continue to assess the situation during implementation of the soil treatment standards and may, in the future, establish an extension, if necessary.

- "Soil contaminated with hazardous waste. Air Products favors the language of Section 268.47 which gives the option of using any of the 3 alternatives given. The flexibility will allow the use of more innovative technologies in dealing with contaminated soils." (Air Products and Chemicals, Inc.,CS2P-00141)

- "Air Products supports EPA's proposed language in 40 CFR 268.47 which would allow the use of any of the 3 options for soil cleanup. A variance procedure should be allowed to apply treatment of high level wastes that get good treatment without burning. The flexibility would be a good way to promote non-combustion technology for soil remediation. However, Option 1 – 90% reduction with requirement to treat to a concentration less than or equal to ten times the universal treatment standard – could require unnecessary treatment if it were the only option promulgated. Option 1 is redundant if Options 2 and 3 are promulgated. These options can be used and still be fully protective of human health and the environment." (Air Products and Chemicals, Inc., CS2P-00141)

Response: EPA appreciates the support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "OxyChem believes soil Option 2 (10xUTS levels) is the most reasonable for soil management. However, with UTS based primarily on incineration even 10 UTS, most soil will require incineration. Since the cost may not be feasible, more in-situ remediations may be necessary in the future, even for relatively small spills. OxyChem questions whether effectively encouraging permanent land disposal in consistent with the purposes of the 1984 amendments to RCRA law." (Occidental Chemical Corporation, CS2P-00143)

Response: EPA appreciates the support for tailored soil treatment standards. The option promulgated today, 90% capped by 10xUTS, is consistent with the commenter's recommendation in that further treatment will not be required if constituent concentrations drop below 10xUTS.

Regarding the concern that the soil treatment standards can not be achieved except by incineration, the Agency's analysis of the data shows that non-incineration technologies can reliably meet the soil treatment standards in most cases. In situations where a well designed, well operated application of one of the model technologies on which the soil treatment standards are based failed to achieve the standard, the generator would be eligible for a treatment variance. See 40 CFR 268.44(h).

- “With regard to LDR treatment standards for hazardous soils, EPA has proposed three alternatives:

  a. Range of standards with a “ceiling” one order of magnitude above the Universal Standard, provided 90% treatment occurs.

  b. Range of standards with “ceiling” one order of magnitude above the universal standard.

  c. Achieving 90% treatment with no “ceiling”.

  This Department is in favor of alternative “a..” It provides considerable flexibility, while still requiring a high level of treatment for heavily contaminated soils. The difficulty with alternative “b” is that the “ceiling” becomes, in effect , the standard. This is not appropriate, if EPA’s data indicates that the universal standards, which are an order of magnitude lower than the “ceiling,” are generally capable of being attained. Alternative “c” is rejected because a percentage reduction standard can still result in considerable contamination remaining in the soil, if the soil was badly contaminated, high-risk material to begin with. Alternative “a” may be the most stringent of the three, but, considering the variety of hazardous soils and chemical combinations encountered, a conservative approach at this time would best serve to protect human health and the environment.” (State of New York Department of Environmental Conservation, CS2P-00144)

- “However a second TNRCC commenter from our pollution Cleanup Division is concerned with practical problems with the proposed rule. The second commenter whole-heartedly agrees with EPA that LDR treatment standards which have been developed for as-generated hazardous waste are not appropriate for application to contaminated media at remediation sites. He believes, however, that use of the alternative treatment standards which EPA has proposed should not be restricted to hazardous soils but should be extended to other hazardous remediation wastes.

  Under the existing LDR regulations, prior to land disposal, all hazardous remediation wastes and hazardous soil must be treated to achieve the same standards which apply to as-generated hazardous waste. Under the approach espoused by EPA in these proposed rules, the hazardous remediation wastes that can be segregated from soils using simple mechanical removal processes must be treated to achieve the LDR standards applicable to as-generated hazardous waste while less restrictive alternative treatment standards would apply to hazardous soils.

  The second commenter notes that EPA’s proposed approach would resolve a portion of the problems caused by the application of LDR treatment standards to remediation sites. He appreciates this change since it has beer clear for a long time that the current

LDR program has inappropriately distorted and constrained the remedy selection process for both state and federal superfund site. The application of LDRs to remediation sites has had the unintended negative effect of favoring less extensive remedies than would have otherwise been the case. Remedies which do not involve excavation and redeposition (i.e., placement) and treatment have been favored since remedial actions would not trigger the LDRs. Most of the reluctance to use LDRs at remediation sites has resulted from the inappropriate application to contaminated media of treatment standards which were developed for as-generated waste. EPA's proposal to promulgate LDR treatment standards that have been developed specifically for hazardous soils should effectively address this portion of the problem." (Texas Natural Resource Conservation Commission, CS2P-00145)

- "BN also believes that, of the alternatives proposed by EPA treatment standards for hazardous constituents in contaminated soil, the 90% removal criteria without a "ceiling" value would be most appropriate for most of the contaminated soils that BN has to deal with. Biological treatment and low temperature thermal desorption can operate within the range of 90% removal on many contaminants and in many media. There are also many instances and sites that will not achieve 90% removal due to complex contaminant and soils matrices. Even nonhazardous petroleum products are not treatable to 90% removal in clays. There should be some provisions in the regulations that would allow for the application of appropriate technology and eliminate quantitative performance criteria. This approach was taken in the debris treatment standards and has proven to be effective and implementable." (Burlington Northern Railroad, CS2P-00148)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "DWP supports EPA's efforts in establishing soil treatment standard concentrations higher than those of the contaminating waste. This alleviates some of the difficulty of treating hazardous constituents combined with soil.

  DWP supports the proposed treatment standard with a "ceiling" one order of magnitude above the universal standard. This standard is the simplest of the three proposed; only one number per hazardous constituent exists to determine compliance. Also, no additional calculation or documentation is needed." (Department of Water and Power the City of Los Angeles, CS2P-00155)

Response: EPA appreciates the support for tailored soil treatment standards. The treatment standards promulgated today are consistent with the commenter's recommendation in that further treatment is not required if constituent concentrations drop below 10xUTS.

■ "We have reviewed the proposed treatment standards for contaminated soils (58 Fed. Reg. 48092) and support the general concept of your initiative. The following comments and recommendations are offered for the Agency's consideration.

We concur that the proposed change to allow greater flexibility in managing soils contaminated with RCRA-regulated constituents is a positive step which will make clean up activities more efficient, while adequately protecting human health and the environment. We also believe the proposed standards can improve the viability of hazardous soil cleanup at contaminated sites by allowing for consideration of alternative treatment technologies and clean up criteria.

The proposed constituent concentrations levels in the Universal Treatment Standards (UTS) for organics, metals and newly listed wastes are manageable, given the fact that alternative treatment strategies offered in the proposed rule allow the remediated soil to have a range of constituent concentration levels above the UTS. We also believe that there are other factors that should be considered when determining the appropriate constituent concentration levels for a fully remediated site. Please see the section "Risk Assessment and Background Levels of Constituent", on page 3 of this comment.

Three alternative treatment standards for contaminated "hazardous soil" were proposed in 58 Fed. Reg. 48096. The following discussion addresses each alternative, and provides our rationale for selecting the "best" alternative treatment standard.

(ALTERNATIVE ONE)

90% treatment ceiling value for hazardous constituent(s); 90% reduction of hazardous constituent(s) from untreated soil must be met along with the resulting constituent concentration range falling between the UTS and equal to or less than 10 times the UTS..

We believe this is the least efficient alternative. If the hazardous constituent concentration in the soil after treatment satisfies the condition of being above the UTS level, but less than or equal to ten times the UTS, then this should satisfy the criteria.

(ALTERNATIVE TWO)

Range of values with ceilings: Range of final hazardous constituent concentration levels falls between the corresponding UTS and the times the UTS (or ceiling).

This alternative treatment standard appears to be the most clear cut from the generator standpoint, because the constituent concentration levels to be achieved after remediation will be well defined. There is also less ambiguity and no guess work involved as to the desired treatment constituent concentration level. Also, this method is the most technically consistent, and provides equitable standards for the regulated community.

(ALTERNATIVE THREE)

90% treatment with no ceiling: Achieve 90% reduction of the initial, untreated hazardous constituent concentration in the untreated soil. This approach allows for an unlimited range of valuates above the universal standard provided 90% treatment is attained for each hazardous constituent. The treated soil would then meet the treatment standards at 90% treatment, even if it exceeds the UTS by several orders of magnitude. This method is far more technology and economics driven that option one or two, and carries with it much greater risk if the treated soil constituent levels are still high (relative to the UTS) after treatment.

This method, from the technological standpoint, appears to provide the best alternative treatment standard. Largely dependent on the original level and type of contaminants, as well as the type of treatment technology used, it provides greater economic appeal to contractors cleaning up a site where no means are available to remove more than 90% of the hazardous constituent. For example, if the soil is lightly contaminated, which is often the case, it may be more cost effective and easier to clean up a site by reducing the hazardous levels by 90%. Generally, the constituent concentration would then fall within the range of the UTS. For this scenario, the “no ceiling” in constituent concentration seems adequate, since the 90% reduction in hazardous constituents may render the soil suitable “clean” for use.

Analytically, measurements from soil constituent level tests routinely give a wide standard deviation of values; therefore, the 90% reduction treatment standard provides a reasonable and achievable range of values. Often, measured hazardous constituent levels in soil can vary by one or two orders of magnitude. This can be caused by technique differences between analytical technicians, soil matrix heterogeneities, and even variability in the treatment technologies. Achieving a 90% reduction in hazardous constituents may be easier to prove than the UTS values and range.

However, there is also a significant levels of risk involved when a heavily contaminated site is only remediated by 90%. One concern with this treatment standard is that it is largely dependant on the types of hazardous constituents and the original concentration level of the hazardous constituent(s). A 90% floor on the treatment of soil may not, in all cases, reduce the hazardous constituents to levels which protect human health ad the environment.

Lockheed Corporation proposes that EPA incorporate two options, the current options two and three in the final rule. This would give the site clean up contractor or generator greater flexibility on selecting the treatment technology that would be the most cost effective , while still reducing the hazardous constituents in the contaminated soil to levels that no longer pose a significant health or environmental hazard.. Option two would be used at cleanup up sites where cost effective treatment technologies are available that are capable of reducing the hazardous constituent concentrations to the UTS level or a ceiling of ten times the UTS. Option three would be used where the available technology, such as bioremediation, could readily reduce the level of contamination by 90%, but not reach the UTS. Under the appropriate condition with regard to site characteristics and type of contamination, this option would provide for adequate clean up of the site. Making both of these options available, subject to the mutual agreement of the clean up contractor and the oversight agency, would result in more contaminated soil sites being remediated in a timely manner and at less cost and burden." (Lockheed Corporation, CS2P-00158).

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The option promulgated today, 90% capped by 10xUTS, is consistent with the commenter's recommendation.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

■ "EPA states that, "when today's proposed soil treatment standards are promulgated, hazardous soil will become subject to those standards in lieu of the treatment standards for the RCRA wastes contaminating the soil."

Subjecting hazardous soil to the proposed standards (where the UTS would serve as the "base" standards) instead of the existing treatment standards for the RCRA wastes contaminating the soil will have a significant effect on certain categories of hazardous soil (in particular, soil contaminated with selenium and mercury). For instance, under the existing rules, mercury-contaminated soil (DOO9) which leaches greater than 0.2 mg1 mercury in the TC extract must be treated to the LDR level for RCRA TC mercury waste (0.2 mg1) before it can be land disposed. If the UTS as proposed are promulgated, the soil would be required to be treated to 0.009 mg1based on TCLP, which is a more than an order of magnitude lower than the existing standard. Even if EPA selects a treatment option that would allow the universal standard to be exceeded by an order of magnitude (as discussed in Section VII.C.1 of these comments), the level the soil would have to be treated to would still be 0.09 mg1, which is less than half of the existing level of 0.2mg1. The additional expense associated with achieving these lower levels potentially could be great.

Considering this type of scenario, DOE suggests that EPA continue to allow treatment of hazardous soils to standards for the underlying RCRA wastes contaminating the soils as an alternative to the proposed approaches. Since the existing LDR requirements were promulgated to achieve acceptable levels of treatment, allowing the option of using the standard for the underlying RCRA wastes likewise should be considered adequate treatment." (DOE, CS2P-00161)

Response: Consistent with the commenter's recommendation, today's final rule allows hazardous contaminated soil to be treated either to comply with the soil treatment standards or to comply with the universal treatment standard for the contaminating hazardous waste.

- "Our primary concern focuses on the treatment of mercury contaminated soils. Specifically, A.G.A. supports EPA's option of achieving 90% reduction with no "ceiling" with a minimum treatment level of 0.20 ppm Toxic Characteristics Leaching Procedure (TCLP) level. Higher levels should be allowed where demonstration shows that there is not a risk to human health or the environment.

  In proposing Option C, achieving 90% treatment with no "ceiling", EPA acknowledges that there is no question as to whether innovative technologies can generally meet the numerical standards proposed under the other options. Furthermore, EPA notes that many of the achieved treatment levels are based on bench scale tests. A.G.A. concurs with this assessment. A.G.A. , the Interstate Natural Gas Association of America (INGAA) and the Gas Research Institute (GRI) have been working with EPA for several years to determine appropriate treatment technologies for contaminated mercury soils found at natural gas regulator and meeting stations."
  (American Gas Association, CS2P-00165)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA notes that the option promulgated today is consistent with the commenter's recommendation in that further treatment will not be required once constituent concentrations are reduced by 90%.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "Due to large variability in the characteristics of soils containing metals and metallic compounds, any management standards promulgated for metal bearing soils must be sufficiently flexible to allow for choice of the most appropriate technology in any given situation.

  Asarco does not endorse LDR treatment standards based on EDA's proposed universal treatment standards (UTSs) for metals in nonwastewaters.

  Asarco does not endorse arbitrary treatment standards such as 90-percent treatment.
  Asarco opposes setting a total standard for any metal-bearing nonwastewaters including for soil containing lead." (Asarco, CS2P-00166)

- "Asarco has practical experience addressing issues and problems that have during the management of soils at specific remediation sites. This experience has shown that it is ineffective, inefficient, and counterproductive for EPA to apply generic remedies and standards; this includes applying LDR treatment standards under RCRA to soils that instead should be managed according to plans approved by the authority overseeing the remediation.

  It is essential that remedy decisions (including how soils are to be managed) be made on a site-specific basis. Imposing generic national requirements (such as LDR treatment standards) has the potential to interfere with and/or present conflicts with site-specific remediation decisions. For instance the National Contingency Plan Specifies that one of the criteria used to guide the development and screening of remedial alternative is cost. There may be some cases in which consolidating soil in one unit (which might constitute "placement") may be a desirable alternative from the standpoint of protecting human health and the environment: However, applying RCRA LDRs for this type of alternative will increase the costs–possibly to the degree that the alternative is rendered infeasible. As another example, given the variability of soils, meeting LDR treatment standards may not be possible in some cases. This could necessitate going through the treatability variance process causing an unnecessary delay in the progress of remediation.

EPA correctly acknowledges that factors such as the large volumes of soil, wide variations in contamination of soil, and varying soil types can affect a soil remediation project. Because of these and other factors, the choice of the most appropriate management practices will necessarily vary from site to site. EPA's own soil database and information available in Superfund studies including Remedial Investigation/Feasibility Studies (RI/FSs) show the extremely wide variation in soil treatment results.

Asarco is particularly concerned about the need for site-by-site flexibility when managing metal-bearing soils. As EPA has recognized in administering RCRA, mining and mineral processing sites and wastes containing metals and metallic compounds present unique issues. Factors distinguishing sites and wastes containing metals and metallic compounds (e.g., mining mineral processing sites) include the following:

> the tendency for metals to form heavy metal complexes and/or bond to the soil matrix (and therefore not be very mobile in the environment);
>
> the generally low bioavailability of metallic compound species in metal-bearing wastes and soils contaminated with these wastes;
> the inherent technological and economic limitations of achieving greater metals recovery from these wastes and soils, especially at low metals concentrations;
> the high volume and low toxicity of wastes at mining and mineral processing sites; and
> the vast size of many mining and mineral processing sites.

EPA's RCRA mine waste study and report to Congress are particularly relevant to Asarco's concerns regarding the unique nature of mining and mineral processing sites. That report concluded:

> Factors governing leaching rates, fate, and transport of constituents [at and from mine sites] are complex, highly site-specific, and dependent on physicochemical properties of both the waste and the local subsurface environment. For example, ph, reduction-oxidation potential, adsorption, coprecipitation processes, and complex chemical and hydrological interactions are unique to each site.

Remediation costs at mining sites have been high compared with average costs. The average Superfund remediation cost is $30 million/site; however, remediation at the Bunker Hill mining site (coverage 21 square miles) has been estimated by EPA to reach up to $120 million. Any EPA decision, such as imposition of RCRA LDR requirements, that further inflates the cost of remediation without contributing to protection of human health and the environment would be seriously injurious to parties involved in cleanup and to other members of the public who benefit when cleanups are completed in a timely, reasonable, and cost-effective manner." (Asarco, CS2P-00166)

Response: Many commenters expressed concern over application of LDRs to remediation waste, including contamianted soils. Most of these commenters, like this commenter, suggested that EPA exempt remediation waste, including contamianted soil, from a duty to comply with LDRs.

The Agency generally shares commenter's concerns about application of LDRs to remediation waste, including contamianted soil. However, the current statute seems to compel it. See RCRA Section s 3004(d)(3) and (e)(3). The Agency continues to believe that legislation is necessary to address this issue and will continue to participate in legislative discussions.

- "Asarco believes that EPA should construct an overall regulatory framework that will allow remediation involving soils that EPA would define as hazardous to be carried out with oversight of the relevant authority and without imposition of generic RCRA LDRs. However, since EPA's September 14, 1993 proposal may be indicative of the Agency's current thinking on soil management issues and because EPA has reiterated its request for data relating to the treatment of hazardous soils. Asarco presents the following comments on the treatment standards that EPA proposed in its September 14, 1993 notice.

  In its proposal, EPA stated that it was proposing "alternative technology-based treatment standards for soils." However, the proposed treatment standards were based on approaches that included two elements: (1) multiplying the UTSs by an arbitrary factor of 10, and (2) choosing a generic 90-percent reduction standard. These proposed treatment standards plainly were not derived from technology data for specific soils. Although EPA attempts to justify the arbitrary numbers by referring to its soils treatment database, the technical data presented fail to support the proposed treatment standards, particularly for metal-bearing soils.

  EPA acknowledged that "the data may not represent potentially problematic matrices and varying contaminant levels." The Agency also acknowledged that more than 50 percent of the tests EPA used as support for its treatment standards were bench-scale (rather than pilot-scale or full-scale tests). The data for soil washing included no pilot-scale or full-scale tests. EPA stated that high temperature metals recovery (HTMR) processes include rotary kiln, the plasma arc reactor, the rotary hearth electric furnace system, the molten slag reactor, and the flame reactor. However, only one of these technologies (rotary kiln) is on the list of treatment technologies for which EPA has data; EPA lacks data for the others. EPA should note that HTMR processes could include other types of smelting furnaces such as blast furnaces, flash smelting furnaces, and so forth, even though to date application of these technologies to contaminated soils treatment is limited.

While Asarco undertakes metals recovery where feasible, in the company's experience there are limited circumstances in which HTMR technologies are feasible for soils due to low metals concentrations, unless the soil matrix can serve as a replacement for flux materials. Metals recovery becomes less economically feasible with lower metals concentrations. Below a certain concentration, metals recovery is not technically feasible due to thermodynamic constraints.

For these reasons and others discussed below, Asarco does not support the proposed LDR treatment standards for metal-bearing soils. Asarco believes that there will be a significant number of actual situations in which the best available management method for a metal-bearing soil will not correspond to the proposed UTS-based or 90 percent treatment-based standards. EPA points to the option of petitioning the Agency for a treatability variance when a hazardous soil cannot be treated to the LDR standard. Forcing various parties to resort to the variance process is inappropriate because this lengthy process almost certainly will delay and encumber remediation efforts. In addition, it would place further budgetary strain on EPA which would have to review a large number of petitions.

EPA's three proposed options for setting hazardous soil treatment standards each rely on the universal treatment standards (UTSs) to some degree. As explained in Asarco's previous comments on other portions of the proposed rule, Asarco does not endorse EPA's proposed UTSs for metal constituents, particularly for nonwastewaters, and does not believe the EPA has provided adequate technical support for their adoption.

EPA's proposed numeric UTSs for metals (except arsenic) in nonwastewaters are based on the performance of HTMR and hydrometallurgical technologies. Asarco does not support these UTSs because the Agency uses a hypothesis that the effectiveness of the performance of these technologies is matrix independent. The performance of metals extraction technologies is dependent on metal concentrations and speciation as well as matrix composition. Furthermore, as EPA itself acknowledges, metals recovery technologies "are not generally practical for treating hazardous soil because of the relatively low levels of metal contamination typically found in soil." Any treatment standard that is a descendent of a number based on the use of metals recovery is clearly inappropriate when applied generically to soil.

Asarco is particularly concerned about EPA's setting an LDR for arsenic-containing soils based upon a UTS that relies on slag vitrification. Asarco strongly discourages the application of any such standard to soils because the efficacy of vitrification for arsenic in soils is unproven. In fact, EPA includes only one test of vitrification in its database, and it does not appear that metals data from this single test were used. In addition, it is worth noting that vitrification is generally an extremely energy-intensive process. When treatment is required, Asarco's experience indicates that stabilization generally appears to be the most effective treatment for arsenic-containing soils. Asarco's experience indicates that the proposed UTS for arsenic (and even an order of magnitude greater than the proposed UTS) may not be achievable by available technologies for soil in some situations.

EPA specifically requests comments on whether a 90-percent treatment standard should be applied to inorganic constituents. Asarco does not support the use of an arbitrary 90-percent treatment standard, particularly for metals. EPA's arbitrary choice of 90 percent is not supported by technical data and may not be possible to achieve in some cases, depending on the characteristics of the particular soil. Such a treatment standard is particularly inappropriate for metals, which cannot be destroyed in the sense that organics can. Furthermore, a 90-percent treatment standard would have the inappropriate result of being more difficult to meet for low metals concentration soils than for higher metals concentration soils. In general, the lower the metals concentrations in a soil, the more difficult the metals are to remove or recover.

The most appropriate treatment technologies for soil, if treatment is necessary, generally involve stabilization, immobilization, and/or solidification. In fact, EPA's soil treatment database contains very sparse treatment data on other kinds of technologies (i.e., other than immobilization or stabilization) for metal-bearing soils. Based on the Agency's proposed regulatory language, it appears that EPA is proposing to apply the 90-percent treatment standard to whole waste concentrations. However, the treatment benefits achieved by stabilization, immobilization, and solidification generally are not measurable by a reduction in total waste concentration. Therefore, any whole waste concentration treatment standard for soils containing metals or metallic compounds would be virtually meaningless. (The 90-percent treatment standard would still be arbitrary and inappropriate as discussed above if applied to leachate instead of total waste." (Asarco, CS2P-00166) [Also see Chapter 27.A.]

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

EPA does note, in response to the commenter's specific concern regarding treatment standards for metals, that the final standards are based upon the performance of stabilization technologies (not high temperature metal recovery). EPA notes that Agency data show that the soil treatment standards can routinely be met in metals contaminated soil using stabilization and solidification technologies. The Agency confirms that use of theses technologies to treat metals contaminated soil (as well as use of any other technology that meets the soil treatment standard and does not constitute impermissible dilution) is allowed.

- "The principal soil constituent in Louisiana is clay, so the proposed standards will have a large impact on the treatment of hazardous soils at sites in the state. To fully protect the environment and the people of Louisiana a strong set of guidelines is needed to ensure that there is a consistency in remediation between different sites. Failure to remain consistent could result in litigation as a site required to clean to a lower level could challenge the cleanup level for a similar site with a higher treatment level.....

  Of the three approaches proposed for establishing treatment standards for hazardous soils, the LDEQ agrees with the setting of a ceiling one order of magnitude above the universal treatment standard, providing that 90% treatment of each constituent subject to treatment is achieved. This approach would give the most consistency throughout all sites and would be the most protective of the environment and human health.

  The relaxing of the treatment levels in the other two approaches for the sake of alternate technologies is not justified. The alternate technologies must demonstrate that the treatment can be as effective as established treatment methods prior to being used or approved.

  The second approach is untenable in that a site with constituent levels just over the one order of magnitude ceiling would require little treatment to reach the ceiling. While this would be a cost saving for the site, it would not significantly reduce the constituents that required the soil to be classified as hazardous in the first place.

  The third approach is also untenable in that sites with gross contamination could still after 90% reduction have significantly high levels of a hazardous constituent remaining. An example of this would be a site with 50,000 mg/kg of lead contamination. Treatment to 90% would reduce the level to 5,000 mg/kg which is three levels of magnitude over the established treatment level. This would be totally unacceptable to the LDEQ. It is felt that the variance mechanism is adequate for dealing with sites that cannot meet the treatment standards." (Louisiana DEQ, CS2P-00167)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

EPA has found that the soil treatment standards minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by contaminated soils and the distinct policy issues raised by the remediation context under which most contaminated soil is managed. The Agency notes that the soil treatment standards, like other LDR treatment standards, are not and should not be used as cleanup levels (or as levels which automatically allow contaminated soil to exit the RCRA Subtitle C system). The treatment standards are based on the performance of specific soil treatment technologies, not an analysis of risk.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "The September 1993 notice also set forth a proposal to derive treatment standards for soils. Although this proposal has now been incorporated into the RCRA Hazardous Waste Identification Rule (HWIR) process (59 FR 10778, March 8, 1994), AIHC would like to endorse the <u>rationale</u> behind this proposal. Again, although there are still technical concerns with the basis for the suggested three approaches to developing compliance levels, AIHC believes that the proposal correctly identified the need for treating soils differently from wastes. The proposed standards, which were not only presumably less stringent than for waste, were also an attempt to promote the treatment of soils by innovative technologies other than by incineration." (AIHC, CS2P-00168)

Response: EPA appreciates this support for tailored soil treatment standards.

- "As explained in part II above, API agrees with EPA that treatment standards for hazardous soils should be addressed in the upcoming HWIR proposal and not as a stand alone rulemaking, and therefore will withhold evaluation of soil treatment standards until it submits comments on the upcoming HWIR proposal. Nevertheless, API does acknowledge that the framework developed under HWIR may not be appropriate for <u>every</u> site with hazardous waste contaminated media, particularly where a responsible party wishes to engage in a voluntary cleanup. Therefore, though API does not support technology-based treatment standards <u>per se</u>, such standards may nonetheless be a useful alternative under such circumstances.

  For example, for a facility that engages in the generation and temporary storage of a limited suite of hazardous wastes (e.g., a '90-day' generator of hazardous waste) and where there may have been an accidental spill of listed wastes in the past that requires some remedial attention, the universal standards may be something that the generator could utilize. The contaminated soil may be excavated and transported off site for treatment without triggering the attention of, or need for, oversight by regulatory officials. Alternatively, the generator could use the standards as a screen to determine whether the soil needs to be treated at all. Even under these types of circumstances, API still believes that the generator – fearful of future environmental liability – will likely engage an overseeing agency in an attempt to 'approve' the cleanup activity. Such an 'approval' process will quickly begin to resemble the site-specific remedial action plan (RAP), being discussed under HWIR. API is, therefore, not convinced that there will be a large number of truly 'self-implementing' cleanups, where LDR treatment standards could be used exclusively to satisfy remedial needs or obligations.

However, to satisfy the need for a simple remediation approach in situations like those described above, API suggests the application of a modified version of Approach B or 'Range of Standards with a "Ceiling" One Order of Magnitude Above the Universal Standards,' outlined in the Phase II LDR proposal (58 FR 48125). As proposed by EPA, one would have to treat a volume of hazardous soil to achieve a concentration in the treated soil between the universal standard and an order of magnitude greater than the universal standard.[16] There would be no obligation to achieve a specific percent reduction in initial (pre-treatment) constituent concentrations. API believes that this option affords the greatest opportunity for the use of innovative technologies (i.e., alternatives to combustion technologies). Specifically, one may be capable of treating a particular volume of contaminated soil to achieve the target range of constituent concentrations, without having to mandate a specific percent reduction in initial concentrations. This allows a manager of contaminated soil the flexibility to utilize a non-combustion technology (e.g., biotreatment) to achieve the desired results.

As stated above, API could support a 'modified' Approach B to address situations like those above. The Approach would be modified such that the UTS for polynuclear aromatics would be revised as recommended by API in comments submitted on UTS for wastes on November 15, 1993 (in the discussion addressing the applicability of the universal standards to petroleum refining wastes). This would result in the revision to the target constituent concentration ranges for these soils (e.g., for benzo(a)pyrene the target range would be 12 mg/kg - 120 mg/kg versus 3.4 mg/kg - 34 mg/kg, as proposed)." (API, CS2P-00169)

Response: EPA appreciates this support for tailored soil treatment standards.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment

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[16] As outlined in the EPA proposal, compliance with this approach would be on a 'total constituent concentration' basis for organic constituents and on a 'concentration in a leachate extract' basis for metal constituents. API believes, however, that the basis for compliance with treatment requirements should be on a concentration in a leachate extract for both metal <u>and</u> organic constituents.

standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The option promulgated today is consistent with the commenter's recommendation in that further treatment will not be required if constituent concentrations drop below 10xUTS.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "In general, Coastal urges EPA to develop "universal treatment standards" that are based on risk to human health and the environment and are achievable using cost-effective technologies which have been demonstrated in industry practice. As will be noted in the specific comments that follow, Coastal urges EPA to adopt Option C as stated in its proposed rulemaking with the maximum amount of required treatment of soils being the present RCRA action levels. Furthermore, treatment above these present levels should be allowed upon demonstration of no significant risk to human health or the environment.

  For example, Coastal supports EPA's Option C because it requires achieving 90 percent reduction of mercury in soil with no "ceiling." However, Coastal believes that final treatment below the present regulatory levels of 0.20 parts per million (ppm) Toxicity Characteristic Leaching Procedure (TCLP) is unnecessary to protect against significant risk to human health or the environment.

  In proposing Option C, EPA acknowledges that there is a question as to whether innovative technologies can generally meet the numerical standards proposed under the other two options. Furthermore, EPA notes that many of the achieved treatment levels are based on bench-scale tests. Coastal, as a member of the American Gas Association, the Interstate Natural Gas Association of America and the Gas Research Institute, has been working with EPA to determine appropriate technologies for contaminated mercury soils found at natural gas regulator and metering stations." (Coastal, CS2P-00172)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The standards promulgated today are consistent with the commenter's recommendation in that further treatment is not required if constituent concentrations are reduced by 90%. EPA has also, consistent with the commenter's recommendation, provided an opportunity for site-specific, risk-based standards to cap the technology-based soil treatment standards if such risk-based standards are shown to minimize threats within the meaning of RCRA Section 3004(m) and are approved through a variance process. The so called site-specific, risk-based treatment variance is discussed in detail in the preamble to today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "EPA proposed to apply the Universal Treatment Standards (UTS) to all wastes including soils. Conoco believes that technology-based standards such as the UTS will be lacking. A risk-based approach is necessary to ensure flexibility, protection of human health and the environment, and timely, cost-effective solutions.

  EPA proposed three alternative treatment standards for hazardous contaminated soils:

  > UTS < LDR < 10xUTS provided 90% treatment of each constituent present is achieved.
  >
  > UTS < LDR < 10xUTS
  > 90% treatment is achieved; however no requirement to treat below UTS.....

  "The proposed treatment standards do not consider the risk actually presented by contaminated soil. Factors such as site geology and hydrogeology, potential pathways and receptors, site use (current and future), background concentrations, and naturally occurring constituents must be considered in any evaluation of treatment standards.

  EPA has made no allowance in the treatment standards for natural soil composition. This is particularly troubling for metals where natural soil concentrations can be orders of magnitude higher than proposed standards depending on the soil type, vegetation, and location." (Conoco, Inc., CS2P-00177)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

Consistent with the commenter's recommendation EPA has provided an opportunity for site-specific, risk-based standards to cap the technology-based soil treatment standards if such risk-based standards are shown to minimize threats within the meaning of RCRA Section 3004(m) and are approved through a variance process. The so called site-specific, risk-based treatment variance is discussed in detail in the preamble to today's final rule. EPA has also clarified that further treatment is not required once constituent concentrations fall below naturally occurring background concentrations.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "Time Oil Co. epitomizes the benefit EPA's proposed alternative treatment standards for hazardous soils will confer to the environment. With alternative treatment standards, Time Oil can quickly clean up its contaminated property to levels fully protective of human health and the environment and put the property back into productive use. Without alternative treatment standards, Time Oil faces prohibitively high remediation costs without any significant reduction in risk to health or the environment.....

  Time Oil believes that each of the three proposed alternative treatment standards for hazardous soils will benefit both the regulated community and the environment by encouraging timely, proactive remedial action, thereby reducing the potential the potential for migration and decreasing risk. Even the most stringent of these approaches will increase the technical options available to address the large volumes of low to moderately contaminated soil, which in most cases will substantially reduce remediation costs with little or no adverse effect on or significant in risk to human health or the environment.[17]

  Time Oil's Portland terminal is a perfect example of the disproportionate costs the current land disposal restrictions on contaminated media impose upon the regulated community in relation to the environmental and human health benefits the restrictions confer. The proposed hazardous soil treatment standards represent a necessary and appropriate correction to this imbalance." (Time Oil Co., CS2P-00178)

[17] Time Oil assumes that universal Treatment Standard is the lower limit for all three approaches. Although not explicitly stated in the proposed rule, Time Oil assumes that, under proposed approach 1, treatment that achieves the Universal Treatment Standard need not also achieve 90% reduction to comply with the hazardous soil treatment standards. If EPA adopts proposed approach 1, this clarification should be made in the final rule at 40 C.F.R. 268.47 (b)(1).

Response: EPA appreciates the support for tailored soil treatment standards.

- "We also suggest a deficiency in part C, *Proposed Approaches for Establishing Treatment Standards for Hazardous Soils*, section 2. Explanation of Numeric Treatment Standards for Hazardous Soils. Under the first approach, the Agency proposes "a range of standards with a 'ceiling' one order of magnitude above the universal standard, provided 90% treatment of each constituent subject to treatment is achieved". This deficiency is admitted in <u>*Scenario 1*</u>, "The standard under this scenario is affected by the untreated contamination level." This proposal would require all levels of contamination, even those that are just over the universal standard, to meet the 90% rule and would force remediation to levels below the universal standard. This approach invites unnecessary litigation and falls outside the bounds of reasonableness. <u>*Scenario 2*</u> is by far the superior method because the limit is valid for all soils regardless of the untreated level. This method assures that the target is reached without unnecessary efforts of the responsible party to meet the arbitrary 90% rule that puts the remediation level below the universal standard. <u>*Scenario 3*</u> invites litigation as does number 1. In both <u>*Scenarios 1 & 3*</u>, the court will refer to *Hazardous Waste Treatment Council v. EPA*, 886 F.2d 355, 361-64 (D.C. Cir. 1989), where they held that treatment standards cannot be established "beyond the point at which there is no 'threat' to man or nature" It does not make sense to promulgate a standard that violates the court's previous ruling." (Biogenesis Enterprises Inc., CS2P-00180)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

Consistent with the commenter's recommendation EPA has provided an opportunity for site-specific, risk-based standards to cap the technology-based soil treatment standards if such risk-based standards are shown to minimize threats within the meaning of RCRA Section 3004(m) and are approved through a variance process. The so called site-specific, risk-based treatment variance is discussed in detail in the preamble to today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "We believe that is not appropriate to reduce standards to below those determined by evaluating the application of specific technology on the specific waste streams to be regulated, standards which EPA has already evaluated to have met the "minimized threats" criteria.

The UTS standards should be a compilation of the standards demonstrated to be achievable for all regulated wastes. It is contrary to logic to arbitrarily reduce these further unless there was a compelling concern regarding the threats posed by the constituent at the current BDAT levels.

The universal treatment standard as proposed is not risk related and is internally inconsistent. For example, the treatment standards for PNAs are overly stringent and do not correlate with risk.

> The delisting level for fluoranthene (100 mg/l leachate which equates to at least 2000 mg/kg total) is 588 times the UTS standard (3.4 mg/kg). Other PNAs show similar contrasts.
>
> PNAs are not water solubles and strongly adsorb to soil and thus pose no potential to migrate in groundwater.
>
> Some PNAs pose a greater health risks than others, yet they have the same treatment standard. (Benzo (a) pyrene vs. fluorene).
>
> The large number of PNAs on the UTS list increase the statistical chances for false positives.

Lowering LDRs once they are already in place discourages the development of new technology by creating uncertainty for those who would otherwise participate in their development. Potential technology providers need to know that they are not chasing a moving target. Potential users of the technology need to know that participating in the development of new technology will not result in standards 'leap froggin' to lower levels, thus forcing the use of more expensive and less available technology. This has a particularly strong impact at site clean-ups where the degree and rate of progress made at a site is inextricably linked to the cost of the treatment technology.

For technology users, there is the real expectation that a successful development will force more stringent treatment standards and raise the cost of doing business in the Unites States. With a fixed standard, technology users have an incentive to see technology advance as they can expect more effective and less costly service in the future. However, a technology driven reduction in the LDR levels creates the 'sinking standard syndrome' where technology users are a bit queasy about participating in bringing new technology to market. Participation can mean that a more costly technology will be developed and imposed.

Specifically, reducing the LDR levels for refinery listed wastes due to the merging availability of high temperature thermal treatment is not the result Chevron was seeking when it participated in the development of this technology.

Chevron urges the EPA not to reduced the existing LDR levels. Reducing these levels will discourage site clean-up to the degree that these standards are applied to soils. If a universal treatment standard is to be created, then it should consist of the least stringent levels from the various waste codes." (The Chevron Companies, CS2P-00182)

Response: Although the universal treatment standards are not the subject of today's rulemaking, in developing the UTS, EPA has in fact adopted the approach urged at the end the comment. Where there are different technologies which substantially treat wastes to reduce toxicity and mobility, the Agency has selected the highest value reflecting proper operation of the technology, and in addition, used the higher-performing of the different technologies.

- "We appreciate and agree with EPA's comments regarding the heterogenous characteristics of soils and the problematic matrices and contaminant levels involved. As noted above, any LDR applied to soils is going to detrimentally impact the progress of all projects and site cleanups involving hazardous soil. However, assuming that EPA rejects the compelling and mounting evidence to this reality, we offer our comments on the proposed approaches.

  The universal treatment standard (UTS) times 10 is attractive to the degree that it provides some flexibility. After all, if the standard can't be met, the soil remains in the ground. Thus, we believe that given the heterogeneous nature of soil and a lack of extensive data on any one technology, that 100 times the UTS is more appropriate. However, even this is overly stringent and undefendable. The 10-3 risk based bright line criteria discussed under HWIR would be an appropriate treatment standard given that non-RAP/non-oversight soils will subsequently be disposed in a hazardous waste landfill.

  We do not believe it is appropriate to apply an arbitrary 90% reduction criteria based on total constituents. Depending on the technology used, the potential of constituents to migrate could actually increase even with a 90% reduction in total concentrations. Rather, the method of evaluation should be tailored to the technology and should measure a compounds potential to migrate. As noted above, we believe the performance of biological treatment is more accurately assessed using a leachate analysis. Applying the TCLP to soils is a much more accurate method than when applied to oily sludges and should be an appropriate method for this evaluation.

  A percent reduction criteria could be used to determine whether a technology is being well operated. If such a technique is applied, it should be evaluated around the operating unit and not on the overall soil inventory. That is, samples would be taken at the inlet and outlet of the unit at a specific time while in operation to demonstrate the reduction. Samples should only be required as often as is necessary to assure generators knowledge that the system is operating well. File records or a note on the manifest may be needed to attest to the fact that the material was treated with an appropriate well operated technology.

This option is far too stringent and complicated. It arbitrarily imposes dual criteria which are likely to trip up the best of technologies for reasons that are not related to risk reduction. This is the 'incinerator full capacity option' which will, ironically, leave constituents in the ground and migrating while lawyers discuss who is responsible." (The Chevron Companies, CS2P-00182)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

Analysis of data from the soil treatment database show that these standards can be routinely achieved using non-combustion treatment technologies (for organics), and by stabilization technologies (for metals).

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "USPCI strongly disagrees with the agency's proposed standards for soils containing hazardous wastes. Despite the Agency's dubious characterization of the standards as technology based, the proposed standards represent a marked departure from the BDAT methodology traditionally employed to set standards for the protective treatment of hazardous wastes. Instead, the Agency proposes standards that are wholly arbitrary, based neither on risks to health nor on performance of technology. Moreover, the EPA's earlier proposal to depart from the BDAT methodology by promulgating middle-of-the-road 'universal treatment standards' which, themselves, are only tangentially based on technology performance (and lack any health justification), renders the proposed soil standards even more arbitrary and less justifiable than they otherwise might be. Because the proposed standards are set at levels above those at which the EPA has determined threats to be minimized, the proposed standards, if finalized, will plainly violate RCRA section 3004(m)(1)." (USPCI, CS2P-00171)

- "USPCI fully supports attempts by the Agency to facilitate clean-up of environmental media to the extent such initiatives are permitted by law and founded in sound public health and environmental policy. Unfortunately, the standards suggested in the Proposal fail on both accounts. On the whole, the Proposal fails to justify the special treatment suggested for soils. In some instances, justification is merely inadequate; in others it is absent. In our view, the Agency can and should achieve its objectives to facilitate site remediation without jeopardizing the continuing vitality of the regulatory system Congress thoughtfully set out in the HSWA. Accordingly, we encourage the Administrator to consider our comments below and refrain from establishing illegal, arbitrary, and unprotective standards with undesirable policy consequences." (USPCI, CS2P-00171)

- "Each of the regulatory options for soils suggested by the Agency are arbitrary in that they are not based on any rational standard and represent a significant and unexplained departure from BDAT methodology. The agency bases its soil standards on the standards set forth in the proposed UTS table for non-wastewaters. Using these as the base standards, the EPA suggests three possible alternative standards for soils:

  a. require treatment to any level between the UTS level and ten time the UTS level provided the level actually achieved represents a 90% reduction from the initial concentration;
  b. set the soil standard at ten times the UTS level; and
  c. define compliance as a 90% reduction from initial levels.

  Option c. and b. are plainly illegal under RCRA. RCRA section 3004(m)(1) requires the Administrator to identify those levels or methods of treatment that minimize short term and long term threats to human health and the environment and to set treatment standards at those levels. Although the Agency correctly notes that the *D.C. Circuit in Hazardous Waste Treatment Council v. EPA* confirmed the Agency's authority to set standards based either on risk or on performance of technology, the court clearly did not authorize the Agency to select a number with only providence as a guide. Options b. and c. amount to nothing more. The only conceivable way in which option c. could be related to technology is upon the rationale that, because illegal dilution is prohibited, some treatment method must be employed to reduce constituent levels by 90%. Option b. is almost as far removed from any footing in technology, supportable only on the assumption that because the UTS standard is presumably, based on technology performance, any number that is derived from the UTS is also technology based. Of course, on this logic, a standard set at 50, 100. Or 1000 times UTS would also be valid. Such a technology basis is related to minimizing threats, if at all, by luck alone. Option a., although somewhat more palatable than b. and c. as a practical matter, suffers from exactly the same flaws as options b. and c. individually. Despite the Agency's strident claims to the contrary, these standards simply are not based on technology performance in the same manner as traditional BDAT standards, sharing only the most remote connections with technology. Nor are the standards related in any way to the performance achievable using the treatment methods the agency seeks to encourage. As the EPA notes copiously in defending its bias in favor of non-incineration technologies, these technologies can generally meet the UTS standards. If that is true, the multiplier-based standards can not be viewed as representing the levels achievable by the technology. We suspect that the Agency's failure to develop treatment standards based on the actual performance of alternative technologies arises principally from the fact that the Agency lacks enough data on the subject to stand up to its own BDAT standard-setting methodology. Thus there is no sense in which the proposed standards are not arbitrary. Instead the standards reflect a plain political desire on the EPA's part to facilitate the use of certain treatment methods. Having arrived at that list, the Agency appears to have then picked a range of levels within which it believed its preferred technologies could perform. And it's a broad range, covering several hundred ppm in some cases. Such politically motivated decision-making is simply an affront to the public-health-enhancing standard that Congress plainly and carefully set out in section 3004(m).

The Agency suggests that the standards proposed for soils containing hazardous wastes continue the process of developing tailored treatment standards, such as the previously promulgated treatment standards tailored to multi-source leachate and to hazardous debris. This statement is misleading because there is little or no similarity between the standards developed for multi-source leachate and debris and those proposed for soils. A brief comparison serves to illustrate this point.

The tailored standards for multi-source leachate grew out of the substantial difficulties, primarily encountered at subtitle C hazardous waste landfills, in applying the derived-from rule to leachate collected from on-site leachate collection systems. To resolve litigation over the matter, the Agency reconsidered the standards originally adopted in the First Third final rule, electing ultimately to create an entirely new waste code for multi-source leachate and undertake to adopt standards for the treatability group thus created. The final standards for F039 were based on evaluation of volumes of treatability data accumulated for the entire list of BDAT constituents (more than 200 of them). Those standards were based directly on the best performance of incineration for non-wastewaters. In other words, multi-source leachates must be treated to those levels demonstrated achievable by using the best-performing available incineration.

The final technology-based treatment standards for hazardous debris represent a response to the special matrix difficulties presented by debris and the virtual impossibility of developing numerical standards for the wide variety of debris wastes that might be generated. Final standards for debris are of two general types- those focusing on removal of all hazardous constituents from the debris and those focusing on immobilizing hazardous constituents by affixing them solidly to the debris. In promulgating the removal-based (e.g., destructive and extractive technologies), the EPA determined that the technologies established were appropriate because they would remove all constituents from the debris prior to disposal. Thus these standards compel treatment for debris such that the treated debris presents no threats to human health or the environment. Treatment to meet the extractive performance standards theoretically creates a debris residue that the EPA lacks authority to further regulate under HSWA.

For those extractive technologies the Agency determined could not be definitively shown capable of removing all constituents from debris (in footnote: Those technologies cited by the Agency as unable to adequately perform included "thermal desorption, biodegradation, and chemical destruction." 55 Fed. Reg. 37,228 (1992). Curiously, these are the same technologies that the EPA touts in the proposal as "innovative and superior" to high technology combustion. *See, e.g.*, Proposal at 48124.), the final rules require an equivalency demonstration showing for the particular debris that the technology applied removes constituents to the same extent as other removal technologies. In short, the final rules for debris require treatment to a standard more stringent than the minimize threat statutory standard. The standards require treatment to a level below which the debris is determined to pose no hazards to human health and the environment. Where doubt exists about the effectiveness of a technology in achieving this standard, specialized demonstrations are required to assure public health and environmental protection.

The tailored standards for multi-source leachate and debris can be viewed as requiring treatment to the best levels achievable using available technologies, recognizing the particular difficulties encountered in applying traditional characterization schemes and compliance verification mechanisms to these wastes. Conversely, the standards proposed for soils represent by the Agency's own admission, less that the level achievable by the best performing technology. Thus the EPA proposes to set standards at levels above those that minimize threats to human health and the environment. This result is, of course, plainly prohibited by statute unless the Agency undertakes, as it did for multi-source leachate, to establish a treatability group encompassing soils and develop standards that are truly tailored to the special properties of soils. Whereas the tailored standards for multi-source leachate and debris are based on particular waste properties and represent in each case a rational system for attaining and assuring the highest degree of environmental and public health protection possible using existing available technologies, the standards proposed for soil fly in face of that objective. Under any of the schemes proposed, soils treated using so-called innovative technologies need not be treated to the lowest achievable levels set based on data from incineration even where data reviewed by and in possession of the EPA indicate the non-combustion technologies can achieve those low levels. (In footnote: *See Proposal*, at 48,124. 'Analysis of the available soil treatability data has revealed that innovative technologies can generally achieve the universal standards.' Id. What this means is that, generally, the EPA's standards violate the clear mandate in HSWA to minimize threats through protective standards. 42 U.S.C. § 6924(m)(1) (1988). This breach from HSWA's clear policy choice is obvious even if there can be rational debate about the standards for those constituents untreatable by so-called innovative technologies.) It is plain from the Agency's justification that the proposed standards are not 'tailored' to maximize environmental protection in the same manner as those tailored standards set for debris or multi-source leachate. The EPA's characterization equating its proposed standards for soil with those previously established for multi-source leachate and debris are, therefore, misplaced. In fact, the proposed standards for soil under any of the three alternatives suggested in the Proposal provide reduced overall public health and environmental protection.

What then, are the standards 'tailored' to achieve. There is no suggestion in the proposal that stringent, protective standards based on incineration established for individual wastes are inappropriate for soils. (In footnote: Nor is there any suggestion that the generally less stringent organic universal treatment standards are inappropriate or unachievable. In fact, the Agency's own discussion controverts such a proposition.) Indeed, the Agency would, we suspect, find it quite difficult to argue that the less protective standards proposed are better than more protective standards from a public health and environmental protection point of view. The Agency makes no suggestion that there exists inadequate treatment capacity capable of achieving more protective standards. Indeed, the Agency cites the abundance of combustion treatment capacity elsewhere in the proposal to justify its decision to refrain from granting a national capacity variance for certain toxicity characteristic wastes. There is no suggestion that matrix effects interfere with treatment in combustion units. Indeed, the 'low and moderately contaminated soil' (In footnote: USPCI is uncertain what constitutes low or moderate contamination. We assume the concept is of some importance, however, give the Agency's assertion that "[a] common sense approach would indicate that incineration would be practical only for 'hot-spots'." Proposal, at 48,129.) that the agency claims predominates would be treated quite effectively to the lowest achievable and most protective standards regardless of matrix interferences." (USPCI, CS2P-00171) [Also see Chapter 27.A.]

- "There is no basis in RCRA for the sort of policy choice the EPA will make by applying an arbitrary factor to already achievable treatment standards to 'assure achieveability' by technologies unable to meet stringent environmental standards. (In footnote: For example, the proposed standards under scenario A (standards set at 10 X UTS) allow disposal of soils containing as much as 1600 parts per million of acetone to be disposed or left substantial amount of acetone. The NIOSH recommended exposure limit for acetone is 250 ppm (10hour TWA). e.g., United States Department of Health and Human Services, Pocket Guide to Chemical Hazards 42(1985). Under the 90% reduction scenario (scenario B), the value could be higher depending on the initial chemical concentration.) The clear congressional message in the HSWA demands that the EPA set standards to minimize threats to human health and the environment by the most protective available means, including the most protective treatment standards achievable using existing technologies.

  We recognize that whether a particular technology is appropriate to treat a particular waste is germane to the determination whether that technology should be viewed as BDAT. It is not our intention to dispute the Agency's general consideration of that factor. However, it is our view as a matter of policy that this factor should not become a sole springboard to relax standards achievable by the best demonstrated available technology in favor of less capable technologies. Rather, the standards should be set to encourage advancements in less capable technologies (e.g., those EPA terms innovative). Only through such pace setting standards can the Agency assure a continuing high degree of public health and environmental protection while nurturing improvements in our waste management system. Unfortunately, the proposed soil standards are likely to have the opposite effect. By setting arbitrary standards at limits known to be less than the most protective readily achievable, the Agency fixes technology at its current level and removes incentives for advancements. We believe such a marketplace without incentives to excel will become mediocre at best before long. HSWA demands, and the public deserves, better from Agency policy." (USPCI, CS2P-00171)

- "In short, we believe that the proposed soil standards, if finalized, will violate RCRA section 3004(m). Moreover, the standards have the appearance of an administrative attempt to cure problems with CERCLA by employing RCRA to augment the Agency's ability to control decision-making at response sites. In our view, this represents a poor policy choice because it attempts to gut the essential mandate of HSWA and insert in its place a relaxed system of regulation that will add nothing to human health or environmental protection. Accordingly, we encourage the EPA to withdraw the Proposal and undertake to set standards for soils that are based on something other than a guess. Because soils are, in fact, among the most treatable wastes and because the EPA, itself, admits that its preferred technologies can meet more protective standards, we respectfully suggest that the Agency leave the existing regulatory system unaffected (except as otherwise noted above) and focus its efforts on more immediate problems." (USPCI, CS2P-00171)

- "For example, the proposed standards under scenario A (standards set at 10 x UTS) allow disposal of soils containing as much as 1600 parts per million of acetone to be disposed or left on site in conformance LDRs. By any measure, that is a substantial amount of acetone. The NIOSH recommended exposure limit for acetone is 250 ppm (10 hour TWA). e.g., UNITED STATES DEPARTMENT OF HEALTH AND HUMAN SERVICES, POCKET GUIDE TO CHEMICAL HAZARDS 42 (1985). Under the 90% reduction scenario (scenario B), the value could be higher depending in the initial chemical concentration." (USPCI, CS2P-00171)

Response: This commenter, the operator of hazardous waste incinerators, strongly objects to tailored LDR treatment standards for contaminated soil and recommends, instead, that EPA continue to require that contaminated soil achieve treatment standards based on the performance of incineration. EPA disagrees. As the Agency has indicated many times, notwithstanding that it is possible to treat contaminated soil using combustion, the Agency's longstanding policy is that it is generally unsuitable or impractical from a technical standpoint (and hence inappropriate, in the language of 268.44) to combust large volumes of mildly contamianted soils. See, for example, 55 FR at 8760 and 8761 (March 9, 1990) and 61 FR 18806-18808 (April 29, 1996).

The Agency has found that the soil treatment standards promulgated today minimize threats within the meaning of RCRA Section 3004(m) considering both the distinct treatability issues posed by contamianted soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed. This issue is discussed further in the preamble to today's final rule. However, EPA notes that the levels selected are not arbitrary, but rather are based on the possible values that could have been selected as achievable based on the performance of non-combustion technologies, of careful study of a data based containing thousands of data points on performance of different technologies treating contaminated soils. This approach provides the same type of measure of objective performance as other technology-based standards.

- "The generator should have the flexibility to select a treatment standard option, on a site-by-site basis, as outlined in the proposed 40 CFR 268.47(b) (page 48200).

  Range of standards with a ceiling one order of magnitude above the universal standard provided 90% treatment occurs. A set treatment standard is sufficient to ensure proper management of the hazardous media. Each batch of contaminated media at an individual site will vary in contaminant concentration. Even though the contaminated media would be treated to the same target value, there would be considerable administrative difficulty in demonstrating and documenting 90% treatment was achieved for each lot of media treated.

  Achieving 90% treatment with no ceiling. This option has the greatest potential to drastically enhance flexibility of remedial actions. However, a treatment standard should specify a constituent concentration and not eh process treatment efficiency. The implementation will be extremely subjective through the selection or treatment processes. There would be difficulty in demonstrating and documenting 90% treatment was achieved for each lot of media treated. Final disposal practices would be a key factor.

  Range of standards with a ceiling one order of magnitude above the universal standard. This option is recommended as the best approach. The option establishes a set standard and is the easiest to implement." (Department of the Army, CS2P-00160)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

Consistent with the commenter's recommendation EPA has provided an opportunity for site-specific, risk-based standards to cap the technology-based soil treatment standards if such risk-based standards are shown to minimize threats within the meaning of RCRA Section 3004(m) and are approved through a variance process. The so called site-specific, risk-based treatment variance is discussed in detail in the preamble to today's final rule.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "As indicated in the earlier Departmental response to the proposed rule, DOE generally supports the development of Universal Treatment Standards (UTS) in that they will provide consistent and equitable concentration-based treatment standards. However, when standards are based on constituent concentration levels, compliance monitoring efforts involving radioactive mixed waste (RMW) streams can be problematic. These problems can be best addressed by adoption of a flexible regulatory approach that accommodates both concentration-based standards and alternative treatment standards established as specified technologies. As reiterated in the attached comments, DOE believes that there is a particularly compelling argument to be made for such flexibility in the case of treatment standards for certain RMW-contaminated soils.

  Of the three possible approaches proposed by EPA for establishing treatment standards for hazardous soils, the Department considers the second approach (i.e., a range of standards with a ceiling one order of magnitude above the UTS) to be the most appropriate. Since this approach requires treatment to within a specified range of constituent concentrations (regardless of original concentrations), it would establish a consistent basis for all hazardous soils and will cause the least confusion relative to implementation. All three of the proposed approaches, however, will require considerable analytical testing both before and after treatment. Notwithstanding its support for the second approach as the best of the three that EPA proposed, DOE recommends that EPA incorporate specified technology standards as an alternative for the treatment of certain hazardous soils (e.g., RMW-contained soils)." (DOE, CS2P-00161)

- "EPA has previously recognized the merits of specified technology standards as evidenced by its decision to establish specified technologies for hazardous debris based on the type of debris and type of contaminants present (August 18, 1992 final rule; 57 FR 37194). DOE supported this decision and observed that the flexibility provided by that approach is essential, considering the wide variability in form, matrix, constituent concentrations, and other properties of contaminated debris.[2] DOE has previously urged EPA not to limit itself to setting only concentration-based standards or only technology-based standards.[3] Instead, DOE has argued that the regulations should accommodate both alternatives in order to allow maximum flexibility. DOE believes that these arguments are especially valid in regard to RMW-contaminated soils.

As stated in our November 15, 1993 response, large volumes of contaminated soil will be generated within the DOE complex as a result of continuing environmental restoration and waste management activities. At the Hanford site alone, estimates of the amount of contaminated soil and overburden approach 110,000,000 metric tons. The proposed LDR for hazardous soil will have a substantial impact on site cleanup and waste management efforts. Therefore, with regard to the proposed rule, DOE urges EPA to allow an approach that uses the proposed UTS as a "base" and, alternatively, to specify appropriate treatment technologies that can be used for hazardous soils which pose analytical difficulties (e.g., RMW-contaminated soils)." (DOE, CS2P-00161)

- "Although EPA has proposed three approaches for establishing treatment standards for hazardous soils, each of these approaches are based on technology performance and do not account for risk. In the proposed rule, EPA asserts that the difficulties involved in setting risk-based standards are both formidable and controversial. This point is well taken. However, RCRA requires that LDR treatment standards be established that minimize threats (both short and long-term) to human health and the environment. It has not been shown that the technology-based treatment standards proposed in this notice are either necessary or effective relative to minimizing such threats.

  Although EPA indicates that its preference is to establish risk-based levels to cap the extent of hazardous waste treatment, the Agency has instead continued to utilize a technology-based approach to develop the proposed UTS (which also serve as the basis for the proposed soil treatment standards). Simply because a technology exists that can produce a very low hazardous constituent concentration does not mean that this level must be attained in order to minimize threats to human health and the environment. This approach to rulemaking fundamentally is not "necessary to implement the court's opinion" in *Chemical Waste Management v. EPA* since it is not based on risk. EPA's continued reliance on a technology-based approach will have the unfortunate effect of

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[2]See DOE Comments, Proposed Rule regarding LDRs on Newly Listed Wastes and Contaminated Debris, Item V.F.1, p.20 (02/24/92).

[3]See DOE Comments, Notice of Data Availability regarding Response to Court Decision. General Comment 8, p.3. and item II.B.1.1., pp.6-7 (03/04/93); DOE Comments, Advanced Notice of Proposed Rulemaking (ANPRM) regarding LDRs, Potential Treatment Standards for Newly Identified and Listed Wastes and Contaminated Soil, Item III.B.1.a.3, pp. 19-20 (12/09/91); DOE Comments, ANPRM regarding LDRs, Potential Treatment Standards for Newly Identified and Listed Wastes and Contaminated Debris, Item III.A.2, pp. 5-6 (07/29/91).

delaying the establishment of risk-based levels that represent minimize threat levels." (DOE, CS2P-00161)

- "DOE supports the development of standards tailored specifically to contaminated soil media. Such tailored standards are needed to accommodate concentration levels achievable when treatment technologies are applied to soils since these levels may differ from the levels achievable when the same technologies are applied to other waste matrices. Tailored standards are needed which provide the flexibility to adopt practical treatment strategies for remediating contaminated soil media. These standards should account for the fact that hazardous soils are contaminated with diverse hazardous constituents in highly variable concentrations and matrices. Tailored treatment standards are also needed to promote the development and deployment of innovative technologies for soil treatment.

  DOE believes that generators and treaters of hazardous soil should be provided with the flexibility to select the most appropriate treatment option for their specific hazardous soil in light of site-specific conditions. Consequently, DOE supports the promulgation of treatment standards that are "based on levels attainable by a variety of technologies, including innovative technologies." (DOE, CS2P-00161)

- "It is unclear from the regulatory language proposed in §268.47(b) whether EPA is proposing to make all three of these approaches available for hazardous soil, or whether only one of them will be selected for final promulgation. The Agency's intent with respect to the implementation of these three regulatory approaches needs to be clarified.

  EPA states that the treatment standards proposed under the three approaches "are based on levels attainable by a variety of technologies, including innovative technologies" (58 FR 48122). As explained in the proposed rule, the primary objective in regards to developing an LDR program for hazardous soil is to set treatment standards that are appropriate for soil. Each of the three proposed approaches offers a degree of flexibility in choosing suitable treatment methods for hazardous soils. DOE fully supports this primary objective and urges the Agency to adopt a regulatory scheme that facilitates the use of different technologies and allows the selection of the most appropriate technology for hazardous soil at a particular site.

  Of the three proposed approaches, DOE believes that Approach 2 (range of standards with a "ceiling" one order of magnitude above the UTS) is the most technically sound. For the reasons outlined in the comments which follow, the Department favors this approach over either Approach 1 or 3 (see discussions in response to sections VII.C.1.a-c). However, all three of the approaches proposed will require considerable analytical testing, both before and after treatment is conducted. Such requirements to not take into account the potential analytical difficulties that can be encountered when dealing with RMW-contaminated soils. Thus, DOE believes that EPA should expand the proposed regulatory scheme to include appropriate specified technology treatment standards for certain hazardous soils as an alternative to the proposed approaches. Such an alternative wold be similar to the treatment standards established for hazardous debris in 40 CFR 268.45. Please refer to the comments provided in the sections below for a more detailed discussion of this concept.

As indicated in the Departmental comments submitted previously in response to the proposed rule[13] (and in a number of other previously submitted DOE comments[14]), analyzing RMW for low concentrations of hazardous constituents can be very difficult due to radiological dose and safety considerations that dictate the use of special sample collection devices and alternative sample sizes. Under each of the three proposed approaches the UTS would function as "base" standards, and compliance monitoring relative to the 90% treatment requirement would be necessary under Approach 1 and 3. Consequently, such handling difficulties will be encountered under any of the three approaches when certain RMW-contaminated soils are sampled to verify compliance with the proposed numerical standards or constituent reduction requirements.

As stated in response to the October 24, 1991 ANPRM,[15] DOE firmly believes that generators and managers of hazardous soils should be provided with the flexibility to select the most appropriate treatment option for their particular hazardous soil waste streams. Recognizing the difficulties involved with meeting potential sampling and analysis requirements associated with RMW-contaminated soil and the need for a flexible regulatory approach for selecting the most appropriate treatment methods, DOE recommended that EPA specify a number of acceptable technologies for categories of hazardous soil, and in particular for RMW-contaminated soils (following the same type of regulatory approach promulgated for hazardous debris). With respect to certain RMW-contaminated soils, DOE believes that there is a valid need to include specified technologies as part of the regulatory framework. For certain unique RMW streams where verifying compliance with the UTS or the constituent reduction requirement will be extremely problematic, DOE again urges the Agency to establish appropriate

[13] See DOE Comments, Proposed Rule regarding LDRs for Newly Identified and Listed Wastes and Hazardous Sol, General Comment #2, pp.2-4, item III.A.1, pp. 8-11, and Item IV.A.2, pp. 35-36 (11/15/93).

[14] See DOE Comments, Interim Final Rule regarding Treatment Standards for Certain Ignitable and Corrosive Wastes, General Comment 2, pp. 2-3, and item III.A.1., pp. 12-13 (07/09/93, DOE Comments, Notice of Data Availability regarding Response to Court Decision, General Comment 8, p.5, and Item II.B.1.1., pp. 6-7 (03/04/93); DOE Comments, Proposed Rule regarding LDR Treatment Standards for Newly Listed Wastes and Contaminated Soil, item III.B.1, pp. 11-17, Item III.B.4, pp.21-22, and item IV.D., pp. 27-29 (12/09/91); DOE Comments, ANPRM regarding LDRs, Potential Treatment Standards for Newly Identified and Listed Wastes and Contaminated Debris, Item III.A.2, p. 5 (07/29/91); and DOE Comments, ANPRM regarding LDRs, Potential Treatment Standards for Newly Identified and Listed Wastes and Contaminated Debris, General Comments, p.1, and Item II.D.c, p. 7 (06/28/91).

[15] See DOE Comments, ANPRM regarding LDRs, Potential Treatment Standards for Newly Identified and Listed Wastes and Contaminated Soil, Item IV.D, pp. 27-28 (12/09/91).

specified technologies as alternatives that can be employed in lieu of the proposed approaches.

The following discussion elaborates on specific sampling and analytical difficulties associated with RMW. DOE has encountered significant difficulties in meeting the Test Methods for Evaluating Solid Waste Physical/Chemical methods (SW-846) sampling and analysis requirements for RMW, and has experienced similar difficulties associated with RMW-contaminated soil. The difficulty and costs associated with sampling and analysis increase as the constituent concentration levels that need to be detected are lowered and as radiological exposure increases. Some of the analytical difficulties and costs associated with sampling and analysis of RMW include:

- Sample collection: SW-846 requires the use of specific sample collection equipment and containers that may not be appropriate for RMW-contaminated soil. Robotics may be needed to collect samples of highly radioactive wastes. EPA required sample volumes cannot be obtained for high dose RMW because these samples volumes would result in excessive radiation exposure to personnel collecting the samples and conducting these analyses.

- Storage: Special sample storage containers must be used to address radiological hazards. Refrigeration of samples cannot be achieved to EPA protocol in all instances because samples must be placed in pre-designed lead-lined shipment containers that to not lend themselves to cooling; refrigerated transport vehicles for radioactive material are not currently available. Once in the laboratory, refrigerated storage of samples is also difficult. The lead pigs used to contain each sample are very heavy, restricting the number of samples that can be stored in a refrigerator. The refrigerator itself must also have adequate shielding.

- Interference due to the radiological matrix: The presence of high radiation fields can interfere with organic and inorganic constituent analysis, resulting in inaccurate concentration data..

- Manipulating high activity RMW: Analysis must be conducted in hot cell laboratories. The use of manipulators is very time consuming, and as a result it is often difficult to conform to the holding times specified in SW-846.

- Limited analytical capacity/capability: Laboratory capacity as well as capability for handling RMW organics is limited. The shortage in capacity is most acute for higher activity wastes. Labs are often backlogged with samples awaiting analysis.
  Radiological samples may require analysis in vented hoods or in remotely handled hot cells, depending upon the toxicity of the radionuclides and the

complexity of the chemical operation (e.g., dry or wet). With regard to the Toxicity Characteristic leaching Procedure (TCLP), for example, some low-level RMW (e.g., uranium-235, -236 or -238) can be processed in a conventional laboratory that has health physics monitoring if the toxicity levels of the radionuclides are low enough. Other low-level waste with higher toxicity (e.g., strontium-90) may require processing in a radiochemical hood. For transuranic (TRU) waste (e.g., plutonium-bearing waste), the TCLP will generally be run in a glove box, while high-level waste must be processed in a hot cell. Once a gas chromatograph/mass spectrometer (which costs between $120,000 to $150,000 a piece) becomes "hot" due to exposure to radionuclides in samples, it must be dedicated to analysis of radioactive materials only.

Waste disposal: Protective clothing and equipment used during sampling activities must often be handled as low level radioactive waste (LLRW). Contaminated equipment (e.g., glassware) used in the laboratory must be disposed of as LLRW. The costs associated with cleanup and waste disposal after analysis are substantial.

- Exposure: DOE's health and safety program policy is to maintain exposures As Low As Reasonably Achievable (ALARA). Not only are there opportunities for exposure during collection, handling and transport of samples, but there are also opportunities for exposure during analysis.

Due to the unique difficulties associated with RMW sample collection, handling and analysis, DOE urges EPA to consider expanding the proposed regulatory scheme for hazardous soils (i.e., in which the UTS would function as "base" standard and percent reduction may be required) to include an additional option for problematic RMW-contaminated soil. The additional option would require treatment using <u>acceptable specified technologies with demonstrated performance and/or design and operating standards as an alternative to the concentration-based standards being proposed in this notice.</u> Allowing the option of specified technologies as an alternative for RMW-contaminated soil would alleviate the analytical difficulties and reduce worker exposure, since LDR verification (i.e., testing) relative to concentration based standards would not be required.

DOE suggests that consideration be given to identifying specific treatment technologies as the Best Demonstrated Available Technologies (BDAT) for particular categories 9i.e., treatability groups) of hazardous soil, with the choice of which technology to use being left up to the generator or treater managing the soil. The specific treatment methods could be selected from the nine general technologies identified by EPA as demonstrated and available for treating hazardous soil – (1) biological treatment, (2) chemical extraction, (3) dechlorination, (4) high-temperature metals recovery, (5) solidification/stabilization /immobilization, (6) thermal desorption, (7) thermal destruction, (8) vitrification, and (9) soil washing (58 FR 48128). Appropriate treatment technologies contained within the soil treatment database (i.e., those listed by the four-character alphanumeric codes in Table I on pp. 58 FR 48128-9) could be recognized as acceptable treatment methods for specific hazardous soil categories.

Performance of the specified technology or similar technology with equivalent performance characteristics would be confirmed and documented through treatability testing prior to remediation operations. This approach would obviate or eliminate the need to conduct analyses of the treated soils during the remediation operations, thereby minimizing workers exposure to radiation." (DOE, CS2P-00161)

Response: EPA appreciates this support for soil-specific treatment standards. Regarding the suggesting that EPA express soil treatment standards as specific technologies for certain types of contaminants, EPA disagrees. The Agency notes, that, like any other LDR treatment standard, the soil treatment standards may be achieved using any technology that does not constitute impermissible dilution. Given the range of soil types and contaminant combinations that may be encountered in the field, the Agency believes this flexibility is especially important for contaminated soil.

Regarding the suggestion that EPA allow consideration of risk in developing soil treatment standards, the Agency, in part agrees, and, in today's final rule has established a site-specific, risk-based minimize threat variance which may be used to establish alternative soil treatment standards that are higher than the technology-based standards under appropriate circumstances.

Regarding the concerns about the difficulties associated with radioactive and hazardous wastes, the Agency is not, at this time persuaded that additional treatment standards specific to this type of contamiation is appropriate. However, in situations where, because of sampling or other issues, compliance with the soil treatment standards would present unacceptable risks to on-site workers, the Department could apply for an LDR treatment variance under 40 CFR 268.44(h), based on an argument that the LDR treatment standards were inappropriate.

- "Under the proposed approaches for setting treatment standards for hazardous soils, the UTS are proposed a Section as "base" standards. The proposed UTS for organic constituents are based on total composition, while the metals standards for nonwastewaters are expressed as levels measured in TCLP extract. For certain hazardous soils (i.e., soils containing both organic and metal constituents), this means that two different analytical procedures will have to be used. Furthermore, the UTS for organics is based on total concentration rom a grab sample, while the TCLP required for nonwastewater metals will need to be performed on a composite sample. This regulatory approach will result in additional (and potentially unnecessary) sampling and analytical costs associated with retrieving different sample types and performing different analysis for hazardous soils contaminated with both organic and metallic constituents. Given the unique and heterogeneous characteristics of soils (and of many other wastes for that matter), EPA should provide a technical justification for its basing the UTS for organics (and proposed universal metals standards for wastewaters) on total composition but basing the UTS for nonwastewater metals on TCLP levels. This difference appears unnecessarily burdensome for wastes containing organic and metal constituents.

In some scenarios, depending on particular characteristics of the waste and the intended treatment technology, an analysis of only a TCLP extract concentration for each contaminant may be sufficient for measuring the level of treatment (i.e., establishing treatment standards using TCLP levels in addition to those proposed). DOE believes that setting TCLP standards for organics as well as all metal wastes is particularly important with respect to the management of RMW. Inclusion of TCLP treatment standards for organics would be especially useful relative to the treatment of certain RMW using appropriate immobilization technologies. This would allow the generator or treated the option of either treating to the TCLP extract concentration or the total concentration standard for nonwastewaters depending on the treatment method utilized. Exclusion of a TCLP treatment standard for nonwastewater organics, as proposed, will eliminate utilization of technology developments in the area of stabilization of organic constituents." (DOE, CS2P-00161)

Response: EPA has clarified in the preamble to today's final rule that the type of sample used to measure compliance with the soil treatment standards is dependent on the treatment technology applied. That is, for technologies that stabilize or immobilize hazardous constituents, compliance should be monitored in TCLP extract; for technologies that remove or destroy hazardous constituents, compliance should be measured using total constituent concentrations.

- "The first approach proposed by EPA is a range of standards with a "ceiling" one order of magnitude above the universal standard, provided 90% treatment of each constituent subject to treatment is achieved. Under this approach, if the generator or treater of hazardous soil achieves a treatment standard above the universal level (but no higher than the ceiling), they must document that at least 90% treatment has been achieved.

  DOE does not support this approach for the following reasons.

  Inconsistent and Inequitable Treatment Standards

  Although the treatment standards under this approach may meet the objective of minimizing threats to human health and the environment, this approach will be inequitable and economically impractical. For example, consider the case of two areas of soil contaminated with methylene chloride where the first area has an initial concentration of 450 mg/kg and the second area has a concentration of 45 mg/kg. The

UTS is 30 mg/kg, so the ceiling would be 300 mg/kg (30-300 mg/kg range). For the first area , the soil would have to be treated to a concentration of not greater than 45 mg/kg, which is within the range, and then it could be land disposed. However, even though the initial concentration of the soil from the second area is already within the range, and is ____ the concentration of the soil from the first area after 90% treatment, the soil from the second area must still be treated to reach a concentration of not greater than 30 mg/kg before it can be land disposed. This is inequitable and also economically impractical given the substantial cost of treating soil whose hazardous constituent concentration levels are already low.

This approach in effect, would penalize those managing soils contaminated with low concentration levels by requiring them to treat to lower levels than those they heavily contaminated soils. Requiring that wastes with lower levels of constituents be treated to lower constituent concentrations 9down as far as the numerical UTS) would potentially force treatment to standards below acceptable risk levels. If ten times the standard is acceptable from a risk standpoint (an argument this approach supports), then the expenditure of limited resources to achieve additional treatment beyond this point is unnecessary.

Situations could arise where the initial concentration of a constituent was only slightly above the ceiling concentration, and would thus require a 90% treatment. If this efficiency could not be achieved, the soil would be subject to the base UTS concentration, which also might be unattainable, leaving a treatability variance as the only alternative.

<u>Complex Approach and Cumbersome Documentation</u>

Determining compliance relative to this approach has the potential of becoming overly complex, especially for those soils with multiple constituents at varying concentrations. Documenting at least 90% treatment is likely to be cumbersome to implement, and without any significant improvement in regards to minimizing threats to human health and the environment. The additional paperwork and associated calculations would be prone to errors and would not be as straightforward as achieving a numerical or technology-based standard. The complexity associated with compliance evaluation for various constituent concentrations would be time consuming and difficult to assess." (DOE, CS2P-00161)

- "Of the three approaches proposed by EPA in the proposed rule, the Department considers the second approach for establishing treatment standards to be the most appropriate for soils. Since this approach requires treatment to within a specific range of constituent concentrations (regardless of original concentrations), it establishes a consistent basis for all hazardous soils and will cause the least confusion relative to implementation. As EPA states, only one number (or range) per constituent would function as the treatment standard independent of treatment efficiencies (58 FR 48125). Requiring that treatment achieve levels at or below the ceiling irrespective of treatment efficiency would provide the greatest treatment flexibility while limiting threats to the environment. This approach would simplify compliance verification and determinations related to treatment efficiencies, require fewer analyses by the regulated community, and would constitute a more cost effective regulatory program. As noted in the preamble, this approach has the flexibility to allow greater numbers and types of innovative technologies to be applied to remediation. For instance, it would not preclude solidification/stabilization technologies from being used for organic contaminants. Also, the other proposed approaches have the potential to create situations at large remediation sites where different treatment requirements would apply to different areas of contamination.

However, notwithstanding its support for this approach s the best of the three that EPA proposed, DOE believes and recommends that EPA should also allow specified technology standards as an alternative for the treatment of hazardous soils. As discussed earlier in these comments (see General Comment #2 and section VII.C) and in a number of previous DOE responses to LDR-related rulemakings, DOE is concerned about the application of concentration -based standards to certain RMW streams , including RMW-contaminated soils. In order to confirm compliance with the low concentration-based standards associated with any of the three proposed approaches, considerable sampling and analysis will need to be conducted. In the case of RMW-contaminated soils, this sampling and analysis will pose radiological dose and thus human health issues. Therefore, DOE again urges EPA to minimize this potential threat to worker safety by adopting specified technologies as the treatment standards for certain hazardous soils as alternatives to the concentration-based treatment standards (and requisite sampling and analysis requirements) inherent to the proposed approaches.

Large volumes of information regarding the treatability of contaminated soils should be available from the CERCLA program, which could be used as a basis for establishing technology based treatment standards for hazardous soils. Additionally, this is the basic approach the EPA discusses in “Obtaining a Soil and Debris Treatability Variance for Remedial Action.” Superfund LDR Guide #6A (Superfund Publication: 9347.3-06FS). This guidance provides a list of technologies that are capable of providing a variety of hazardous constituent reductions ranging from 90 to 99.99%. As indicated in the guidance, the technologies identified are those that can attain the alternative Treatability Variance levels. Thus, Doe believes that there is sufficient information regarding soil treatment technologies and their corresponding toxicity reduction efficiency to allow the EPA to establish specified technology treatment standards for hazardous soil.

DOE further believes that specified technology treatment standards would provide a cost savings to the regulated community by eliminating the need for performing additional analytical testing to demonstrate compliance with the proposed concentration-based treatment standards. The EPA could also take a similar approach as was taken for hazardous debris with regard to treatment technologies that would allow a waste to be removed from RCRA Subtitle C regulation. EPA could specify soil treatment technologies that provide sufficient reduction in toxicity, mobility and/or volume (TMV) of waste sufficient to allow such waste to exit RCRA Subtitle C regulation after treatment. EPA could specify additional requirements, such as contingent management options, for treatment technologies. Hazardous soils treated by these types of technologies would either remain subject to RCRA Subtitle C regulation or be exempted provided they were managed in accordance with the specified contingent management standards.

The Agency solicits comment on how waste would still be incinerated if this approach were promulgated.

DOE agrees that this approach likely would "increase the number and type of innovative technologies capable of achieving the treatment standards" for hazardous soils. Therefore, all things being equal, a greater reduction in the use of incineration for treating hazardous soils would be realized using this approach in comparison to the first or third approach. However, considering that the UTS function as the "base" standards and that the UTS for organic nonwastewaters are themselves based on the performance of incineration, this proposed approach (as well as the first and third approach) may have the unintended effect of encouraging the use of incineration and discouraging the use of other technologies. Incineration usually results in the complete, or near complete, destruction of contaminants, except for metals and radionuclides. Many innovative technologies that are being used to reduce contamination to acceptable levels cannot achieve the same destruction efficiencies as does incineration. Moreover, to achieve the proposed treatment levels under certain circumstances (e.g., soils containing high initial constituent concentrations), incineration may in fact be required for certain soils.; Since the overall effect of the proposed rule may be to encourage the use of incineration, the Agency should consider the fact that incineration remains unpopular with many citizen groups, and is often difficult to permit due to state and federal moratoriums on permitting incineration facilities." (DOE, CS2P-00161)

- "**The third approach proposes an unlimited range of values above the universal standard provided 90% treatment is attained (i.e., no "ceiling value") unless 90% treatment would treat the waste to a level below the universal treatment standards (in which case the UTS would have been met).**

DOE does not support this approach for the following reasons.

<u>Neither Technically nor Environmentally Sound</u>

This option of requiring 90% treatment without a constituent concentration ceiling (i.e., allowing an unlimited range of values above the UTS provided there is a 90% reduction) is inequitable. Under this approach, treatment would be required regardless of the original hazardous constituent concentration level. Implementation of this approach could result in the land disposal of soils with high levels of toxic constituent. For example, consider soil from two different areas both of which are contaminated with methylene chloride concentration of 3,500 mg/kg. This is ten times the initial concentration of the soil from the second area and is over 100 times higher than the UTS. This inequity is compounded by the fact that the soil from the second area would still have to be treated to a concentration of not greater than 35 mg/kg. On the other hand, with lightly contaminated soils, 90% treatment may be neither necessary nor justifiable. Valuable resources could be expended and workers and the public could be exposed to unnecessary risks in order to achieve a concentration that is asymptotically approaching zero.

Furthermore, as EPA recognizes with regard to heavily contaminated soils, 90% treatment may not reduce the threats to health and the environment sufficiently. The requirement of a 90% reduction for each contaminant by itself, does not appear to be protective of human health or the environment due to the potential for land disposing soil containing high concentrations of contaminants. As such, this approach would not appear to meet the RCRA section 3004(m) criteria that LDR levels be established so that threats to human health and the environment are minimized.

Effect on Innovative Technologies

Although it could be argued that this approach allows the greatest flexibility in the selection of technologies, this approach might also act to inhibit utilization of innovative technologies (especially for heavily contaminated soils). Innovative technologies often are designed to provide increased effectiveness or to be less costly. Restricting the treatment requirement to 90% reduction would eliminate the need for those more effective technologies that could result in reductions of greater than 90%. The 90% treatment requirement relative to heavily contaminated soils may relax the standards in a manner that would discourage the development and use of more efficient technologies.

Definition of Treatment

DOE is concerned that in developing this approach (and to a lesser degree the first approach) the Agency did not articulate an appropriate methodology that the regulated community should follow in order to determine "percent treatment". Furthermore, if such a methodology were articulated (and it would be necessary to do so in order to provide consistency relative to compliance verification under this approach) it would complicate the LDR framework for hazardous soils. For example, if a hazardous soil has tow contaminants, one with a pretreatment contamination level of 100 ppm, and the other of 1ppm, and the soil is treated to within an order of magnitude of minimize threat levels, the first contaminant may be reduced to 1ppm (99% reduction), and the second to 0.5 ppm (only a 50% reduction), how shall one determine the value of treatment? Would the waste be considered to have been treated to 99% or to 50%? In order to address this concern, DOE believes it would be necessary to adopt a very rigorous and complex definition of treatment. DOE believes that such a definition would unnecessarily complicate the LDR program for hazardous soils." (DOE, CS2P-00161)

Response: EPA appreciates this support for soil-specific treatment standards. On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The option promulgated today is consistent with the commenter's recommendation in that further treatment is not required if constituent concentrations drop below 10xUTS.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "Also in the preamble, the EPA proposes three (3) approaches for developing technology-based treatment standards. ENRON recommends that the second approach be used. The second approach is a variation of the first where the range of standards are one order of magnitude above the universal standards. This approach would simplify the application of the proposed rule over the other two proposed approaches." (ENRON, CS2P-00187)

Response: On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

The option promulgated today is consistent with the commenter's recommendation in that further treatment is not required if constitutent concentrations drop below 10xUTS.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option. Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "This section includes three proposals for alternate treatment standards for hazardous soils, based on the Universal Treatment Standards (UTSs) for hazardous wastes.

  The MDA favors a combination of the second alternative, which requires that the concentration of the hazardous constituents in the soils be reduced to levels at or below ten times the UTS for each constituent, and the third alternative, which requires a 90% reduction in the concentration of the hazardous constituents, but not below the ;UTS for each hazardous constituent. The MDA favors an alternative in which the treatment standard would be the higher concentration of hazardous constituents based on these two alternatives: 1) the concentration of the hazardous constituents in the soil is equal to or below ten times the UTS for each constituent, or 2) the concentration following the reduction of the concentration of hazardous constituents I the soil by 90%, but not below the UTS for each hazardous constituent. The MDA recognizes that technology and cost limitations associated with the treatment of soils containing hazardous constituents, and believes that the combination of these two alternatives provides the most realistic requirement for soils containing hazardous constituents." (Minnesota Department of Agriculture, CS2P-00186)

Response: EPA appreciates the support for tailored soil treatment standrds.

On April 29, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reduction in constituent concentrations or ten times the universal treatment standard, whichever is higher. 61 FR 18805-18813. This is commonly referred to as "90% capped by 10xUTS." EPA is finalizing the 90% capped by 10xUTS treatment standard in today's final rule.

Consistent with the commenter's recommendation EPA has provided an opportunity for site-specifci, risk-based standards to cap the technology-based soil treatment standards if such risk-based standards are shown to minimize threats withint the meaning of RCRA Section 3004(m) and are approved through a varaince process. The so called site-specific, risk-based treatment variance is discussed in detail in the premable to today's final rule. EPA has also clarified that furthre treatment is not required once constituent concentrations fall below naturally occurring background concentrations.

The option promulgated today is consistent with the commenter's recommendation.

The basis for EPA's April 29, 1996 proposed treatment standards is set out in the April 29, 1996 proposal and in the supporting record. Comments on the soil treatment standard options proposed in 1993 were considered when developing the 90% capped by 10xUTS option.

Comments regarding the (90% capped by 10xUTS option are addressed in the preamble to the final rule and in the response to comments document.

- "OHM previously provided comments on the concept of Universal Treatment Standards for process wastes and we are reiterating these comments here as they apply to hazardous soils. OHM strongly supports the concept of UTS, as such standards should ease handling of soils containing commingled wastes and should facilitate bringing new wastes under RCRA control. However, while we support the concept of UTS, we feel that the usefulness of the approach is highly dependent on the quality of the values selected as standards. OHM feels that a reasonably complete consideration of risk issues should be at least factored into the development of the UTS.

  The risk approaches used by RCRA in previous rulemakings (such as the RCRA Corrective Action Rule proposed in July 1990 and the proposed and withdrawn HWIR rule) were criticized by both the manufacturing industry and the coalition of environment groups and fixed-based treatment facilities. The manufacturing sector generally argued that risk-based values were too strict while the environmental groups and fixed-based hazardous-waste treaters argued that the rules were too lax. These criticisms have been fairly easy to make and generally have been valid because of the overly simplistic approach taken to risk assessment in these proposed rules. Risk assessment approaches have been developed by the states of New Jersey (under the Industrial Sites Restoration Act of ISRA) and Washington (Model Toxics Control Act or MTCA) that are reasonably simple to implement but still are complex enough to allow consideration of multiple routes of exposure and multiple chemicals. OHM would recommend that the basis for the values should be consistent with the approach adopted by these states. Namely, the values should sufficiently conservative to be health protective for the vast majority of possible situations but not overly conservative. Variances to the values would then be allowed on a case-by-case basis, with the burden of proof that an alternative value was appropriate falling to the party requesting alternative value was appropriate falling to the party requesting the variance. Generally the burden of proof would rest with regulators, environmental groups, and fixed-based hazardous waste treaters for more stringent values and industry for less stringent values. OHM feels strongly that UTS should represent values that have a risk-based component (technical feasibility and background levels also need to be factors), that are health protective in the majority of cases, and incorporate some flexibility to account for inevitable site and waste-specific variation.

  The UTS have been developed based on the results of treatment (generally incineration for organics) of various wastes. The results are developed using a statistical approach that appears reasonable but the resulting values are overly precise. OHM recommends that values be expressed in factors of 10 (as are reportable quantities; e.g., 1, 10, or 100 mg/kg) to more accurately reflect that actual uncertainty in the values and in analytical techniques. Such an approach would: 1) limit the often substantial debate over scientifically insignificant differences, 2) would facilitate incorporating multiple datasets and approaches (technology-based; risk-based) into the equation used in selecting an appropriate UTS, and 3) would facilitate incorporation of new treatability data (i.e., only if new data suggested a substantial change in treatability would a UTS value need to be changed).

OHM understands that this issue may appear trivial relative to other issues being considered in the proposed rule making. However, we suspect that literally millions of dollars have been spent on addressing the effects of inappropriately precise criteria." (OHM Corporation, CS2P-L0007)

Response: EPA generally agrees that, generally, it would be preferable to base LDR treatment standards on risk considerations if this can be done in a manner that adequately accounts for the uncertainties inherent in making long-term predictions regarding fate of land disposed hazardous wastes, and which adequately minimize threats to both human health and the environment, as required by statute. However, the Agency has, to date, been unable to develop risk-based LDR treatment standards that could be applied at a national level, largely because of the wide variety of site-specific physical and chemical compositions encountered in the field.

Consistent with the commenter's recommendation EPA has provided an opportunity for site-specific, risk-based levels to cap the technology-based soil treatment standards provided such levels are found to minimize threats within the meaning of RCRA Section 3004(m) and are approved through a variance process. The so called site-specific, risk-based minimize threat variance is discussed in detail in the preamble to today's final rule.

5.D TREATABILITY VARIANCES (see Chapter 12)

- "Treatability Variances 58 FR 48127

Requiring a generator to petition the Agency through the Regional Administrator when hazardous soils cannot be meet the universal treatment standards is overly burdensome and will hinder remediation efforts.

As the EPA notes in its subsequent discussion regarding contained-in determinations, where the regulated community is involved in RCRA closures and remedy selections under RCRA and CERCLA, such activities are subject to considerable Agency oversight. EPA should apply similar rationale to variance requests and allow the On-Scene Coordinator rather than the Regional Administrator to grant a variance. The On-Scene Coordinator would understand the relevant site-specific parameters and be able to issue a variance with the added expense and burden of additional and unnecessary paperwork required by the proposed process. Cleanups would not be needlessly delayed while waiting for the Regional Administrator to act on the variance request.

AWPA requests that EPA rethink its proposal procedure for treatability variances." (American Wood Preservers Institute, CS2P-00047)

- "Page 48127. The authority for issuing treatability variances still resides with the U.S. EPA for those variances that have generic applicability. The ability to grant site-specific soil variances has been granted to the Regional Administrators. The ability to grant site-specific variances should be granted to the authorized States that are actually overseeing the soil remediation efforts as RCRA closures, RCRA corrective actions, cleanups under CERCLA and State superfund programs." (Association of State and Territorial Solid Waste Management Officials, CS2P-00091)

Response: EPA agrees that the authority to approve site-specific LDR treatment variances should be delegated to authorized states. The Agency changed its policy on authorization of site-specific LDR treatment variances in 1996 and is now actively encouraging states to become authorized. See generally 62 FR at 64507 (Dec. 5, 1997).

- "The LDEQ feels that treatment should be based on total and amenable cyanides. The variance mechanism should be able to help facilities that have difficulties with soil matrices or other analytical difficulties." (Louisiana DEQ, CS2P-00167)

Response: The treatment standards for cyanide do require treatment of both total and amenable cyanide.

- "Until HWIR Media Reforms are Promulgated, Soil Treatability Variances Will be Needed to Obtain Relief from Treatment Standards Devised for Wastes

  As EPA explained in its Supplemental Notice, when the universal treatment standards (UTS) – proposed in September 1993 – are promulgated in July 1994, they will replace the waste specific treatment standards for many listed hazardous wastes. Accordingly, these standards will apply to soil contaminated with listed hazardous wastes (as well as soils that fail the hazardous waste Toxicity Characteristic) until specific soil LDR standards are promulgated in the HWIR rule. As EPA is aware, the majority of the UTS were developed using incineration as the Best Demonstrated Available Technology – a technology not considered appropriate for the treatment of soils – which are chiefly composed of non-combustible inorganic materials. Moreover, over the course of the past several months, EPA has made a series of public pronouncements through its Combustion Strategy calling for a reduction in the use of combustion technologies for the treatment of hazardous wastes and presumably environmental media contaminated with hazardous wastes. It follows, then, that EPA will look favorably on the use of alternatives to combustion for the treatment of hazardous soils.

  EPA acknowledges in the Supplemental Notice that there may be a need for variances from the UTS on a site-specific basis to foster the use of alternatives to combustion technologies. While API believes that the treatability variance process can be cumbersome and time consuming, it does provide one of the few mechanisms for encouraging alternatives to otherwise inflexible numerical treatment standards devised for routinely generated wastes, not for hazardous soils. Therefore, to reduce the use of combustion to treat hazardous soils, API requires that the Agency ensure that the process for obtaining these variances is as streamlined as possible." (API, CS2P-00169)

Response: The Agency agrees that when LDR treatment standards based on the performance of incineration are applied to contaminated soil, treatment variances are often appropriate. With respect to contaminated soils, EPA has to this point presumed that a treatment variance would generally be needed because the LDR treatment standards developed for process wastes were either unachieveable (generally applied to soil contaminated by metals) or inappropriate (generally applied to soil contaminated by organic constituents). See, for example, 55 FR 8760 (March 8, 1990); 58 FR 48092, 48125 (September 14, 1993); 61 FR 18805-18808, 18810-18812 (April 29, 1996); and, 61 FR 55717 (October 28, 1996). This presumption will no longer apply once today's soil treatment standards take effect. This is because today's standards were developed specifically for contaminated soils and are intended to address the past difficulties associated with applying the treatment standards developed for process waste to contaminated soil.

- "**EPA notes that when a hazardous soil cannot be treated to a specified standard, the generator or treatment facility may petition the EPA for a variance from the treatment standard.**

  The Agency should be aware that in the absence of alternative standards based on specific treatment technologies some problematic waste matrices (e.g., certain RMW-contaminated soil) will continue to require treatability variances." (DOE, CS2P-00161)

Response: The Agency agrees that when LDR treatment standards based on the performance of incineration are applied to contaminated soil, treatment variances are often appropriate. With respect to contaminated soils, EPA has to this point presumed that a treatment variance would generally be needed because the LDR treatment standards developed for process wastes were either unachieveable (generally applied to soil contaminated by metals) or inappropriate (generally applied to soil contaminated by organic constituents). See, for example, 55 FR 8760 (March 8, 1990); 58 FR 48092, 48125 (September 14, 1993); 61 FR 18805-18808, 18810-18812 (April 29, 1996); and, 61 FR 55717 (October 28, 1996). This presumption will no longer apply once today's soil treatment standards take effect. This is because today's standards were developed specifically for contaminated soils and are intended to address the past difficulties associated with applying the treatment standards developed for process waste to contaminated soil. In particular, the standards for organics are no longer based on the "inappropriate" technology of incineration.

- "Unocal is pleased to see the Agency's acknowledgment of the need for LDR treatability variances for the waste specific UTSs that will apply to contaminated soil and debris during the time that the Phase II LDRs have been promulgated and HWIR has not been promulgated. The application of UTSs to contaminated soils of which 80% are likely to be managed outside of RCRA Subtitle C under HWIR is clearly an onerous and unnecessarily expensive requirement. This is especially true when considering the fact that the majority of the UTSs were developed using incineration as the best Demonstrated Available Technology. Incineration is generally seen as inappropriate for the treatment of soils because of the non-combustible composition of soils." (UNOCAL, CS2P-00185)

Response: The Agency agrees that when LDR treatment standards based on the performance of incineration are applied to contaminated soil, treatment variances are often appropriate. With respect to contaminated soils, EPA has to this point presumed that a treatment variance would generally be needed because the LDR treatment standards developed for process wastes were either unachieveable (generally applied to soil contaminated by metals) or inappropriate (generally applied to soil contaminated by organic constituents). See, for example, 55 FR 8760 (March 8, 1990); 58 FR 48092, 48125 (September 14, 1993); 61 FR 18805-18808, 18810-18812 (April 29, 1996); and, 61 FR 55717 (October 28, 1996). This presumption will no longer apply once today's soil treatment standards take effect. This is because today's standards were developed specifically for contaminated soils and are intended to address the past difficulties associated with applying the treatment standards developed for process waste to contaminated soil. Specifically, the standards for organics are not based upon the performance of incineration but rather upon performance of technologies which are appropriate for contaminated soils, and therefore petitioners could not automatically invoke the "inappropriate" prong of the treatment variance provision with respect to such standards.

5.E CONTAINED-IN POLICY (see Section 6.A)

- "The proposed rule would establish treatment standards for hazardous soils and codify EPA's 'contained in' policy for contaminated soils and water. Soils will have to be treated for all hazardous constituents which are present. The standards for hazardous soils would be different than the standards which already exist for hazardous debris, and depending on the alternative approach adopted in the final rule, may also be different from UTS. Under the proposed rule, a petition could be submitted for a determination by EPA that a 'contained-in' waste would no longer be subject to the management standard for hazardous wastes. The EPA could also determine that the 'minimize threats' considerations are satisfied so that the waste would no longer be considered a solid waste and could thus be managed completely outside of RCRA, including Subtitle D. Such a determination could be made prior to or subsequent to treatment.

  As indicated in the comments to the ANPRM, the codification of the 'contained-in' policy was acceptable. Further evaluation is required to determine whether the proposed criteria are sufficiently flexible to address radioactive mixed waste concerns and whether it would be preferable to establish a special regulatory status for RMW soils." (INEL, CS2P-00018)

- "Contained-in determinations should not require approval by EPA Regional Administrator or designee if concentrations of hazardous constituents fall below UTS.

  The EPA's contained-in policy states that environmental media such as soil or ground water that is contaminated with hazardous waste must be managed as the hazardous waste until the waste is separated from the media so that it no longer 'contains' hazardous waste. The policy further states that contained-in determinations documenting that media no longer contains hazardous waste must be made by the EPA Regional Administrator or his designee on a site-specific basis.

  It is recommended that the EPA consider not requiring petitions for wastes which meet UTS. Petitions should only be required if constituents present in the media exceed UTS. The facility would obviously be required to maintain documentation for the determination in its files. Implementation of this change would greatly reduce both time and cost required to manage these materials, and would in our opinion continue to minimize the risk to human health and the environment. Serious impact to EPA resources would also be avoided. EPA should carry this concept to debris as well." (INEL, CS2P-00018)

- "In addition to proposing alternative treatment standards, EPA has proposed establishing a specific process for making any "contained-in" determinations for hazardous debris, hazardous soils and other environmental media. Under EPA's proposal, the EPA Regional Administrator (or State Director) would make these determinations based on a review of a number of specific criteria which are set forth in the proposed RCRA regulations. <u>See</u> 59 Fed. Reg. at 48127-28 (to be codified at 40 C.F.R § 260.42). While HWAC supports the need to codify EPA's "contained-in" policy, HWAC strongly believes that the procedures presented in §260.42 for petitioning the Regional Administrator (RA) for "contained-in" determinations are unnecessarily burdensome, because they increase the administrative duties of regulatory personnel and, ultimately, the time to complete cleanup activities. The process proposed by the EPA in this rulemaking will not only increase the time to complete cleanup activities, it will also increase the total costs associated with cleanups through increased administrative costs with no real environmental benefits.

  Also, HWAC believes that in making these "contained-in" determinations, the primary focus should be on "risk-related" factors. Instead of utilizing the approach in EPA's proposal, HWAC believes that "contained-in" determinations should be self-implementing with a reporting/notification requirement to the RA prior to initiation of any activities related to management of the material as a nonhazardous waste/material.

HWAC suggests rewording §260.42 as follows:

§260.42 Procedures for contained-in determinations for hazardous debris, hazardous soil and other environmental media.

(a) Any owner or operator may determine, in accordance with the procedures presented in this section, that hazardous debris and hazardous soil or other environmental media, including, but not limited to, ground water, surface water and sediments, should be excluded from regulation as a hazardous waste. The owner or operator must have a qualified third-party professional perform the necessary investigations and risk assessments to demonstrate that specific constituent concentrations in the hazardous debris, hazardous soil or other environmental media, including, but not limited to, ground water, surface water, and sediments, to be excluded do not pose a hazard to human health and the environment at that site. Each demonstration must be submitted via certified mail to the Regional Administrator (RA) at least sixty (60) days prior to initiation of management activities for the material of concern as a nonhazardous waste/material. Each demonstration must include:

(1) the owner's and/or operator's name and address;

(2) an explanation, to the extent possible, of the circumstances by which the affected debris, soil, or other media became contaminated with hazardous wastes; and

(3) documentation from a qualified third-party professional demonstrating that the subject material will not pose greater than a 10 to the minus 6 risk to users of a future unrestricted use site. This demonstration must be made via a baseline evaluation of risks to human health and the environment from the residual contamination in the media of concern at the site. The evaluation is to be conducted using sound professional judgement and in accordance with EPA guidance at the time of the evaluation. Documentation must include, at a minimum, the following:

-- physical characteristics of the debris, soil, or other media;

-- waste constituent characteristics such as solubility, mobility, toxicity and interactive effects of constituents present in the contaminated debris, soil, or other media that may affect those properties;

-- reasonable or likely exposure pathways, such as potential for direct human contact with the contaminated media and potential adverse ecological impacts in accordance with the proposed future use of the material;

-- surface and subsurface characteristics such as topography, hydraulic conductivity, permeability and porosity of soil, aquifer thickness, and other geologic and hydrogeologic characteristics that may influence constituent mobility and migration potential at the surface and in the unsaturated and saturated zones.

(b) The RA shall review the information submitted and proceed as follows:

(1) If the RA deems the demonstration to be incomplete and/or inadequate, the RA shall notify the owner or operator of the perceived deficiencies in writing via certified mail within forty-five (45) days of receipt. The owner/operator

shall continue to manage the subject material as a hazardous waste until the perceived deficiencies are fully resolved.

(2) If the RA deems the demonstration to be complete and adequate, no further action will be taken. The owner/operator may manage the subject material in accordance with the future use presented in the documentation submitted to the RA sixty (60) days after submittal of the demonstration, if no written correspondence of perceived deficiencies is received from the RA.

HWAC believes this approach would help streamline the overall RCRA regulatory process. It also would be consistent with the regulatory philosophy adopted in other areas of the RCRA regulations, such as under 40 C.F.R. §262.11, which requires generators themselves to assume the burden of identifying hazardous wastes that they have generated rather than having these generators submit petitions or formal requests for determination to the appropriate governmental agency. In light of existing RCRA civil and criminal sanctions, it is obvious that the appropriate safeguards could still be employed to ensure that hazardous soils were properly managed and treated if this self-implementing program were adopted. Public comment could be solicited only where there is off-site exposure to hazardous constituents. Additionally, in order to make it clear when a party can utilize the "contained-in" route versus meeting the applicable treatment standards, EPA should clarify in the final rule that a party can pursue a "contained-in" determination at the party's option.

HWAC recommends that meeting the UTSx10 "ceiling" standard should serve as an automatic "contained-in" determination, in light of the Agency's direction towards allowing any type of waste to "exit" the Subtitle C system based upon the concentration of hazardous constituents contained therein (i.e., HWIR Committee discussions indicate this direction). This approach would be particularly appropriate if EPA moves to a more risk-based system for establishing the UTS standards, since the standards would then closely resemble the risk-based "contained-in" determinations. HWAC believes that it defeats EPA efforts with this rulemaking to streamline the LDR program by forcing treated decontaminated soil to be managed in a Subtitle C landfill under one scenario (i.e., when applying BDAT under the LDR program), yet allowing the unrestricted replacement of soil under the "contained-in" approach. Often, soil remediation under both approaches might involve the same type of treatment technology leading to the same levels of decontamination and achieving the same degree of risk reduction.

Streamlining the RCRA regulatory process through a self-implementing program also can provide additional incentives to encourage voluntary cleanups of hazardous waste sites. This approach would have the effect of encouraging specific RCRA corrective actions and/or other types of voluntary cleanups by reducing regulatory delays and even minimizing transactional costs and burdens. Regional Administrators and State Directors are already overburdened with the task of managing the RCRA corrective action and CERCLA cleanups that are already on their management plan for next year. It is unrealistic to expect these officials and their staffs also to evaluate contained-in petitions that, in essence, constitute full blown remedial action plans. Cleanups will not go forward if there is no government official available to certify that treated soil has exited the RCRA regulatory regime." (HWAC, CS2P-00020)

- "The proposed procedure for a "contained-in" determination appears to be structured appropriately. However, we would suggest that processing times be inserted to assure that determinations will be made within the time necessary to accommodate 90-day generator accumulation limits." (Boeing, CS2P-00029)

- "The proposed "contained in" determination procedure is unnecessarily cumbersome. See 58 Fed. Reg. at 48,122. In order to make the newly codified "contained in" policy workable, Lilly recommends a streamlined approach.

  EPA has proposed that generators petition for a federal or state agency determination for any contaminated media or debris other than media or debris associated with a RCRA closure or a remedy selection under RCRA or CERCLA. EPA states that the RCRA closure and RCRA or CERCLA remedy selection are already subject to agency oversight and public comment. See 58 Fed. Reg. at 48,127.

  EPA proposes a set of "decision factors" which may be used to make the determination that the media or debris is no longer subject to Subtitle C regulation. While these factors may assist in decision making, they require extensive submissions on the part of the generator and offer no basis for decision making on the part of the agency. This will likely lead to disparate and protracted decision making.

  Lilly proposes a simplified process based on concentration levels which represent the floor for LDR treatment for the various media and in debris. If a generator's waste met this performance standard, the so-called "minimize-threat" level at 42 U.S.C. § 6924(m), the waste could be managed as non-hazardous as long as the generator documented the determination in the operating record. The waste would no longer meet the statutory definition of hazardous waste ("pose a substantial threat to human health or the environment"). The Agency would not have to be involved in this process, beyond periodic oversight or review of data submitted in routine reports. If a generator wanted to have its media or debris considered for exemption at higher levels (above the floor), the procedure described in the proposed rule could be used; including the requirement for agency determination.

Lilly recommends that the streamlined process also apply to RCRA closures and remedy selections under RCRA and CERCLA as well as spill cleanups and other site activities which result in contaminated media. This would expedite cleanups and site remediation." (Eli Lilly and Company, CS2P-00039)

- "As regards complex syntax, Section VII of the preamble includes the following single sentence on page 48128:

  > "Although the contained-in and minimize threat determinations need not be identical (cf. *Hazardous Waste Treatment Council v. EPA*, 886 F. 2d at 362-63, explaining that the minimize threat level is a stricter standard (for example) than the levels at which wastes are identified or listed as hazardous), and indeed is generally regarded as among the strictest of the statutory environmental standards (*id*. and *Third Third Case*, 976 F. 2d at 14), there is no absolute bar to a determination that sufficient concentrations of hazardous constituents have been destroyed, removed, or immobilized to determine both that soil no longer "contains" hazardous wastes and that threats to human health and the environment posed by the hazardous constituents in the wastes have been minimized." " (Department of Energy, CS2P-00043)

- "EPA proposes a contained-in determination criteria for hazardous soil and debris. It is the HWTC position that such criteria should only be applied to soil that meets the UTS x 10 standard discussed above. After the UTS x 20 standard is satisfied, a contained-in determination must be based on a risk assessment that considers all exposure pathways. Just as EPA is doing in the combustion strategy, so also should EPA specify the exact protocols required for these contained-in determination risk assessments, and these evaluations must also include an assessment of ecological risk as well as all human exposure pathways.

  EPA must spell out the contained-in policy criteria more clearly (i.e., surface and subsurface factors) and must include more detail on public participation and risk criteria. EPA must insist on achieving a level of 10^{-6} for carcinogens and the UTS x 10 must be justified on a constituent-by constituent basis based on the risk assessment. Basically, if the UTS x 10 treatment standard is met for the soil and a site-specific risk assessment demonstrates there is no remaining unacceptable risk, the soil may be exempted through the contained-in policy. Or, if treatment to the UTS plus 90% standard is achieved, a back-end risk assessment is not necessary.

Decision factors for making a "contained-in" determination are outlined at 58 Fed. Reg. at 48127-28. On page 48128, EPA requests comment on the contained-in decision criteria. Specifically, "(1) Should the final rule specify a list of criteria that must be considered; (2) should the criteria be more specific regarding the conditions which would allow for or preclude contained-in determinations; and (3) are there other factors the Agency should consider when making contained-in determinations, in addition to those listed above?

The HWTC is in agreement that the decision factors as currently presented need substantial expansion. In response to the first point, we believe that these criteria should be codified in the rule. EPA noted that flexibility was important in making contained-in determinations and the HWTC agrees that some flexibility is important in addressing environmental problems that may pose unique, site specific issues. However, clear national regulations must be provided in order to ensure consistent treatment of wastes and the protection of human health and the environment.

In addressing the second point, the HWTC feels strongly that more specific criteria are required. For example, one of the decision factors listed was "an acceptable risk range of 10^{-4} to 10-6." This statement does not clearly indicate that cancer risk are being considered, does not include decision factors for noncancer endpoints, and provides no guidance as to the desire (target) end of the cancer risk range. As another example, the potential for exposure of sensitive environmental receptors is listed as a factor that must be considered, yet even at Superfund sites, clear objectives for assessing ecological exposure and risks are often not available. HWTC is concerned that without clear definitions and objectives, addressing potential exposure to sensitive environmental receptors may be widely variable in different EPA Regions and could be used to prevent delisting of wastes or at least to give the appearance that such delisting might not be possible, thereby limiting voluntary cleanups.

The seven decision factors are all site characteristics that affect the potential for risk. Rather than simply presenting a short, and quite probably incomplete list of characteristics that affect risk, the HWTC recommends that EPA revise its discussion of the decision factors to focus on the risk management criteria that must be achieved. These criteria could be spelled out in the rule, with the scientific factors that need to be considered presented in accompanying guidance. For example:

L. All cancer risks must be regulated to within a risk range of 10^{-4} to 10^{-6}, with a cancer risk level of 10^{-6} used as a target risk goal for individual chemicals and 10^{-5} used as a goal for multiple chemical exposes.

M. The hazard indices for noncancer endpoints must be less than unity.

N. The site must achieve adequate protection of ecological endpoints.

The specific requirements to achieve these management goals should be spelled out in accompanying guidance documents, such as the Superfund *Risk Assessment Guidance for Superfund* documents. Particular situations that might be important in making a contained-in decision that are not covered in RAGS could be outlined in a separate guidance memorandum.

Note that this position does not conflict with the HWIR "hot spot" approach. The above requirement applies to contained-in determinations for hazardous soils that are treated either on-site or off-site. The HWIR "hot spot" approach is used to identify which soils are subject to treatment in an on-site remediation scenario. "Non-hot-spot" soils identified at a site on the basis of risk assessment would be subject to state cleanup authorities." (Hazardous Waste Treatment Council, CS2P-00060)

- "The HWTC is not in support of any new contained in determination for hazardous debris. The technology specific standards for hazardous debris were developed in the Phase I LDR rule because debris is not amenable to representative sampling, and is not readily analyzed. The existing contained-in policy for hazardous debris that is based on application of the technology specific standard and the clean debris surface criteria should be retained. A contained-in policy for contaminated soil that is based on analyzing specific constituents is sensible, on the other hand, since soil is amenable to representative sampling and analysis.

  The HWTC also urges EPA to develop alternative technology specific treatment standards for debris that would allow for subtitle C disposal. We strongly recommend that EPA amend the "clean debris surface" standard to allow residual staining of no more than 5% of the surface area, without a requirement to inspect each square inch of surface area.

  Perhaps the most serious problem with the debris rule is the impossibility of complying with the "clean debris surface" standard. Now that generators have begun seeking treatment and disposal of their hazardous debris, HWTC member companies are finding that this standard is totally impractical and unworkable.

  Under the final rule, hazardous debris that has been decontaminated is no longer subject to Subtitle C regulation, 57 Fed. Reg. at 37239. To make such a showing for an extraction method, the treatment must achieve a "clean debris surface," defined as debris that is free of all visible contamination except for residual staining "limited to no more than 5% of each square inch of surface area." 40 C.F.R. 268.45, Table 1, n.3.

The final rule states that this 5% criterion "is applied to each square inch of the debris surface," and thus areas covered by large stains cannot be "averaged" with unstained areas. 57 Fed. Reg. At 37230 n.31.

The 5% standard appears to have been based on certain industry standards adopted by the Steel Structures Painting Council for sandblasting to obtain a surface clean enough to paint. However, there are a number of important differences between painting steel structures and treating hazardous debris which makes the 5% per square inch performance standard unworkable in the debris treatment context. First, debris often includes a heterogeneous mix of metal brick, concrete, and a variety of other man-made items. An across-the-board requirement that at least 95% of each square inch of each item of debris be free of residual contamination is unachievable in any practical sense.

Second, debris to be treated using physical extraction methods may be generated as a tangled mass of twisted pieces (e.g., demolition debris). Other parts may be formed into unique shapes that are difficult to treat using the alternative methods. For example, a metal (or composite) pump or motor housing may be formed with cooling fins and recesses that are difficult to reach with conventional abrasive blasting equipment. Transformers and capacitors may have similar problematic forms.

Third, debris may be contaminated on interior surfaces that can be reached with cleaning media but that may be exceedingly difficult to inspect. For example, the interior of a medium diameter pipe may be amenable to abrasive blasting to remove contaminants but not to inspect of each square inch to determine compliance with the performance standard.

Moreover, incremental treatment to the standard may result in very large quantities of residuals (e.g., sandblasting grit) contaminated with very slight concentrations of contaminants. This result would be inconsistent with EPA's emphasis on waste minimization in all phases of the waste management process.

We therefore strongly recommend that EPA amend the "clean debris surface" standard to allow residual staining of "no more than the 5% <u>of the surface area.</u>" Such a revised standard would fully protect human health and the environment and would be achievable." (Hazardous Waste Treatment Council, CS2P-00060)

- "EPA should not codify the proposed case-by-case procedure for determining when hazardous media and debris no longer contain a listed waste. Instead, consistent with its earlier approach for certain debris, once hazardous media meets the treatment standards, the treated media should be exempt form Subtitle C." (GE, CS2P-00076)

- "V. <u>Contaminated Media and Debris Which Meet the LDR Treatment Standards</u>

Should Be Exempt from Subtitle C

EPA has proposed to codify its interpretation that soil contaminated with listed wastes must be managed as a hazardous waste until the soil no longer "contains" the listed waste. Under EPA's proposal, a determination of when a soil no longer "contains" a listed waste could only be made by EPA or a state, and only after submission of a petition, public comment, and a case-by-case evaluation of the need to manage the soil under Subtitle C. EPA also has suggested applying this approach to certain hazardous debris, which, under existing rules, are exempted from Subtitle C regulation once the debris meets the treatment standards. See 58 Fed. Reg. 48,127-128.

GE agrees with EPA's reasons for postponing action on this portion of the proposal, but nevertheless is taking this opportunity to comment. GE opposes the approach discussed in this proposal because the case-by-case "risk" determination is too time-consuming, expensive, and cumbersome and will result in the retention of large volumes of minimally-contaminated media under Subtitle C regulation. It also is inconsistent with the direction of the HWIR dialogue, EPA's recent application f the contained-in principle to certain debris, and, in fact, the whole tenor of the proposed rule, which is to establish consistent, nationwide standards for waste. EPA should scrap its case-by-case approach for codifying the contained-in interpretation and stick to the approach already established for contaminated debris (i.e., treated media or debris that meets the LDR standards no longer contains hazardous waste).

Codifying the "contained-in" policy as proposed will make it extremely difficult for a metal to exist the system once it enters. EPA's proposal would add to the ever-increasing complexity and rigidity of the hazardous waste management program. EPA should take this opportunity to base the RCRA status of contaminated soil on the actual risks, if any, posed by the material. GE believes, as a general matter, that wherever possible hazardous waste management decisions should be based upon risk rather than on the pedigree of the contaminant source (i.e., an entrenched listing description which often does not reflect the nature or concentration of the constituents in the contaminated media).

EPA's goal should be to minimize the quantity of contaminated media that is subject to RCRA Subtitle C controls because they are, for the most part, inappropriate. Many of the requirements promulgated under RCRA Subtitle C establish management standards for process wastes that pose substantial risks to human health and the environment. These standards are intended to be preventative by mandating actions that will prevent these potentially risky materials from causing actual harm. The concepts, basic principles, and, indeed, the whole scheme of the existing hazardous waste management program are directed to industrial facilities which generate hazardous residuals that need to be managed in a manner commensurate with the risk they pose. For example, the most important objectives of the LDR program are preventative measures: (1)

treatment requirements to reduce the concentration and/or mobility of toxic constituents in hazardous waste prior to land disposal, (2) a prohibition on prolonged storage to evade treatment, and (3) a prohibition on dilution that avoids proper treatment. Also, the LDR treatment requirements directly and indirectly foster waste minimization by mandating recycling and imposing costly treatment, respectively. Obviously, the benefits of such preventative measures and waste minimization goals are largely lost once disposal of hazardous waste has already occurred.

EPA should not attempt to impose this paradigm on hazardous media, which generally present a much lower risk and are generated for different reasons and under different circumstances than process wastes. A significant portion of hazardous media are brought into Subtitle C by the “contained in” interpretation or the mixture and derived-from rules and thus media generally have much lower constituent concentrations than process wastes. Contaminated media are also generated in larger volumes than process wastes, making the application of some technologies impractical.

The fundamental goals of remedial activity are efficient and effective cleanups. As is demonstrated by this proposal, these objectives cannot be met if EPA attempts to regulate wastes from remedial activity as if they were newly generated process wastes. EPA should not choose to follow the same path, ignoring the progress made in the HWIR dialogue and formalistically applying the standards used to categorize industrial process waste without regard for the obvious differences between the contexts in which the materials are generated, and the nature of the materials themselves.

EPA’s proposal for case-by-case contained-in determinations, seen in the best light, could be a recognition that some change is needed to bring some rationality to the system. Unfortunately, it is a step in the wrong direction. A critical problem with the existing contained-in principle is that there never has been a clear method for determining when the material no longer contains a listed waste. EPA’s proposal, however, is hardly a workable solution to this problem. Indeed, it will merely repeat the painful, slow and expensive process for ‘delisting” wastes and make it extremely difficult to exit the system once a material has entered, regardless of the risk the material presents. As with the present delisting process, EPA’s proposed case-by-case contained-in determination process, which includes human risk and ecotoxicity evaluations, will be too slow, expensive and complex to provide sufficient relief in the remedial context (where quick and easy-to-apply decisions are critical) and will divert scarce agency resources form much higher-risk issues.[23] The very complexity and expense associated with the proposal will discourage persons from filing contained-in petitions and subjecting their proposal to public comment.

[23]Sometimes contaminated soil is discovered in the context of plant expansions, new construction, etc. Untimely delays in contained-in determinations will create expensive and unnecessary construction delays.

Rather than create a whole new, complicated and burdensome "delisting" process, EPA should establish a simpler self-implementing system. Contaminated soil and debris that meet the treatment standards should be judged to no longer contain a listed waste, and thus, no longer be subject to Subtitle C. This straightforward approach would ensure adequate protection for human health and the environment and would be easy to implement and enforce. Furthermore, it would be consistent with EPA's approach for certain debris contaminated with listed wastes.

In sum, EPA should not establish a burdensome and complex system which needs to be used at virtually every remedial or construction site. Instead, consistent with the proposed UTS approach, EPA should establish a self-implementing and simple system by which soil or debris meeting the LDR treatment standards would no longer have to be managed as hazardous wastes." (General Electric Company, CS2P-00076)

- "<u>Contained-In Determinations</u> (58 FR 48127)

AWPI is very disturbed by the Agency's announced intention to codify the contained-in policy for hazardous soil and other environmental media in new § 261.3(g). Codification of this policy will only impede remediation efforts. Minimally impacted sites would require the same in-depth level of procedural review warranted for heavily impacted sites. As stated previously, AWPI urges the Agency to wait for promulgation of the HWIR regulations before regulating soil. HWIR regulations combined with CAMU regulations should provide and integrated approach to management of contaminated environmental media.

The "acceptable risk range" decision parameter of proposed § 260.42 should reflect the intended site use.

EPA should add clarifying language in the Final Rule that takes into account what the ultimate end-use of the affected site is. For example, it would be inappropriate to use an acceptable risk range based on residential dwelling land-use scenarios when determining the acceptable risk range for sites intended for industrial use. It should be made clear that there are different use scenarios and therefore different risk scenarios and acceptable risk ranges.

The final rule should allow Administrative Appeal of a Regional Administrator's Contained-in Determination.

Under the proposed rule, there is no administrative appeal to a decision by the Regional Administrator. This effectively eliminates getting a second level of administrative review. Presumably, any appeal would have to be taken in Federal District Court, Federal courts are reluctant to overturn decisions by administrative agencies charged with the responsibility of administering complex environmental statutes. This inability to obtain administrative review at the Headquarters level may lead to divergent implementation of the contained-in principle as it is applied in the various EPA regions. This, in turn, would lead to an unequal playing field for AWPI members located in regions that choose to apply the contained-in policy in a more stringent manner than in other areas." (American Wood Preservers Institute, CS2P-00047)

- "Do not codify "contained in" policy for soils

  EPA's proposal to codify the definition of hazardous soil will make any attempts to manage soil, such as for excavation, voluntary cleanup, maintenance, or storm water control, impossible at virtually any industrial site, especially any site which generates a listed waste. Such projects may already be complicated by RCRA or CERCLA issues. However, our experience has usually been that application of some reasonable standards can allow projects to proceed.

  As an operator of industrial facilities, Koppers often must dig a trench to install pipe, regrade soil roads, or install new ditches for storm water improvements. Often, such soil will contain trace levels of chemicals included on the UTS table. Presently, we can generally use such soil to backfill the trend from which it was excavated or reuse the soil elsewhere within the facility. Excavated soil with significant constituent levels, such as being visibly stained, is generally disposed as hazardous waste. We have had good success with some large projects by working with the agencies in reaching mutually acceptable means of proceedings with projects involving large amounts of soil.

  As proposed, at one of these projects, Koppers would have to petition the Regional Administrator for a "contained-in" determination prior to any action. Determinations would likely require multiple submissions, soil testing, risk analyses, and several months to years. All soil would have to be presumed to be hazardous waste until EPA says it is not. Any movement of soil could be considered to be land disposal. (How can land disposal of land be prohibited?) Compliance with and enforcement of this provision would be disruptive to our business and, probably, impossible. EPA should take no action to further codify hazardous soil until it can be part of the HWIR." (Koppers Industries, CS2P-00083)

- "Page 48127. The U.S. EPA is proposing that the requirements for contained-in determinations would not be necessary for RCRA closures and remedy selections under CERCLA. Since this determination will be made by authorized States, these explicit requirements should not be required for cleanups being conducted under State oversight which are not subject to CERCLA." (Association of State and Territorial Solid Waste Management Officials, CS2P-00091)

- "CONTAINED-IN DETERMINATIONS

We support the U.S. EPA's decision to codify within the hazardous waste regulations the "contained-in " policy for hazardous soil and other environmental media. We believe that the decision factors set forth in proposed $260.42 allow sufficient flexibility and are appropriate for making a determination that the media at a specific site no longer "contain" hazardous waste and should thus no longer be subject to the management standards for hazardous waste. We would like to emphasize below several important aspects of the U.S. EPA's proposed contained-in approach which we believe are critical.

We must have the flexibility to apply the contained-in approach not only to soils contaminated with listed hazardous waste but also those contaminated with characteristically hazardous waste (particularly Toxicity Characteristic (TC) hazardous waste). Even though the preamble on 58 FR 48123, 48127, and 48128 does not emphasize this point when it discusses the contained-in approach, the proposed wording of S261.3 does state that soils and other media which are either contaminated with a listed waste or that exhibit a hazardous waste characteristic are not subject to further RCRA regulation provided they conform to the contained-in criteria established in Section 260.42. This is important point since the U.S. EPA has established the principle under the LDR program that if a waste is hazardous at the point it is generated then the obligation to treat to achieve the minimized threat level of RCRA section 3004 (m) for all underling hazardous constituents attaches at that point regardless of whether the waste still exhibits a characteristic at the point of its disposal. In light of this requirement, we believe that it is necessary to extent the application of the contained-in approach to characteristically hazardous contaminated media.

Page 48128. The criteria for the contained-in determination should be made more specific to ensure consistency between States in making the contained-in determination for off-site disposal. The U.S. EPA is proposing that the criteria given for a contained-in determination should be considered when making that determination. The language "will consider" allows a lot of flexibility and may result in broad differences between States in how these criteria are reflected in the decision making process……

It must be acceptable for acceptable for a hazardous soil to be considered initially under the risk-based contained-in criteria of Section 260.42 for a determination of whether the soil is no longer subject to regulation as a hazardous waste. In other words, treatment to achieve the universal LDR treatment standards, as modified for hazardous soils in Section 268.47, should not be required if it can be demonstrated that either the untreated soil, or the soil with a lesser degree of treatment, could satisfy the requirements of Section 260.42. We appreciate that this appears to be the U.S. EPA's position since the preamble at 58 FR 48127 states that a contained-in determination could "be made prior to treatment or subsequent to treatment".

The hazardous waste program (if modified as proposed) would contain two opportunities for a risk-based, rather than a technology-based, approach to be used to determine treatment levels for hazardous soils. This flexibility, which is provided under the Corrective Action management Unit rule and the proposed contained-in rule at Section 260.42, would be directly available for remedial actions conducted pursuant to RCRA or CERCLA authorities. We understand, however, that for a State superfund program to avail itself of this same flexibility to determine that the LDRs would not need to be achieved within a corrective management unit, it would need to receive authorization from its State RCRA Director, provided the State superfund program to use the contained-in rule it would either need to petition the provided it is an authorized state for LDRs to make a final determination." (ASTSWMO, CS2P-00091)

- **"Contained-in" Determination (page 48123)**: GM agrees with codification of the "contained-in" policy for environmental media to provide a mechanism for site-specific determinations that soil, groundwater, etc. no longer "contain" listed hazardous wastes, and thus are no longer subject to Subtitle C requirements. We further agree that contained-in determinations should constitute "minimum threat" levels for a particular site (i.e., function as a cap for LDR treatment standards)." (General Motors, CS2P-00095)

- "Contained-in Determinations (page 48127); GM supports the proposed waiver of RCRA closures and remedy selections under RCRA and CERCLA from the procedures for contained-in determinations for soil. We agree that such activities are typically conducted with considerable Agency oversight, and the decisions are generally subject to public notice an comment.

  We also strongly agree with the Agency's view that due to extreme variations in site-specific and constituent-specific characteristics, specific formulae or other quantitative means of calculating contained-in levels are not appropriate. Rather, a more flexible approach must be adopted.

  GM agrees with the proposed list of waste-and site-specific information (S260.42(c)) to be considered in deciding "contained-in determination". Additionally, in considering subsurface characteristics, not only should depth to ground water be considered, but also whether the ground water is being used as a water source, or is even usable, in a practical sense.

  The final rule should specify only a general list of criteria, (as in the preamble), allowing considerable flexibility for variations in site-specific and constituent-specific characteristics. The criteria should not be more specific than those in the preamble.

  On page 48128, the Agency states that " Although the contained-in and minimize threat determinations **need not be identical** ...", and " .. The minimize threat level is a stricter standard (for example) than the levels at which wastes are identified or listed as hazardous." (Emphasis added). GM strongly recommends that contained-in levels for hazardous constituents should be no lower than the levels at which wastes are identified or listed as hazardous." (General Motors CS2P-00095)

- "EPA is also proposing that in order for treated hazardous soils to exit the Subtitle C system, a "contained-in" determination must be made by the Regional Administrator. We do not believe this mechanism to be appropriate for all soils. A contained-in determination should only be required for soils contaminated with listed hazardous wastes (at least until minimize-risk levels are established for the waste constituents), not soils that are considered to be hazardous only because they exhibit a hazardous waste characteristic. Once a characteristic soil is treated to the extent necessary to meet the LDR standards, at whatever levels they are finally established, the waste should be authorized for disposal in a non-subtitle C unit.[24] The reference to Subtitle C in 268.40(f) should be removed." (Mill Service Inc., CS2P-00098)

- "Under the current regulations, S.S.R. mobilizes on site, treats petroleum contaminated soil from USTs to below state mandated treatment levels (i.e. 100 ppm for TPH), and demobilizes. The treated soil is typically then used as backfill. S.S.R. has successfully treated over 150,000 tons of PCS. Treating other contaminants or performing treatability tests is much more complicated under the current RCRA regulations. Our experience has shown that regulators rely heavily on the "derived from rule"' which basically states that soil containing a compounds that is classified as a hazardous waste, remains a hazardous waste even after treatment. This policy severely restricts the treatment options available to RP's. S.S.R. hopes that new regulations eliminating this regulation are promulgated. This would promote on site treatment, reduce demand on hazardous waste landfills and reduce the overall treatment costs. " (Southwest Soil Remediation, CS2P-00109)

- "[Re. Section VII, B.2] I recommend keeping the wording that allows all soils containing Subtitle C wastes below the final ceiling limit to be declassified as a subtitle C waste. This will encourage treatment and explicitly informs the potential vendors and RP's that once the soil is treated to below the specific level, it no longer is a C waste, and can be backfilled or disposed of as normal solid waste. (Compared to a C waste is a C waste regardless, so why treat??)" (Southwest Soil Remediation, CS2P-00109)

- "Section D -- Contained-in wastes:
  This section is particularly contentious. It appears that the proposed regulations are an attempt to clarify the contained in and derived from rules.

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[24] This, of course, assumes that the treated soil does not exhibit a hazardous waste characteristic.

It is evident that the EPA and its consultants have spent considerable effort in determining the treatment levels presented in these proposed rules. However, Section D may end up undermining all of these efforts and present significant opportunity for RP's, zealous environmentalists and NIMBY activists to hinder on-site treatment or force the soils to be sent to a certified hazardous waste landfill or incinerated (off-site). These will tend to dramatically increase treatment costs making RP's more reluctant to pursue treatment.

I was hoping that the proposed regulations would clarify one derived from rule. Currently, soils containing a hazardous waste are still classified as a hazardous waste regardless of overall treatment costs as the treated soil must still be disposed of as a hazardous waste, regardless of the final contaminant levels unless a site-specific work plan allows for remedy and not a technical remedy as to the final fate of the treated soil.

Granted, site specific conditions (contaminant type, zoning, potential zoning, water tables, etc.) may require that the soil be treated to various degrees, but the EPA should be able to develop applicable standards (stepped).

On the other hand, numerous technologies have been developed that can successfully treat petroleum contaminated soils from USTs. These technologies are both emerging and proven in the field. However, if the same contaminants or constituent (i.e., toluene vs. gasoline) are found in soils not relating to UST activities, then the soil may be classified as a hazardous waste. In this case, the treatment process becomes very complicated and costly, requiring site closure, TSD permits or work plans, etc for the same treatment technology used for treating essentially the same contaminants.

To summarize my comments regarding section D, I believe that these proposed rules introduce a legal or political avenue to determine treatment standards compared to technical standards. The two sets of standards, universal standards vs. acceptable risk standards, do not appear to be mutually beneficial. It raises the question of why have two types of standards? If the risk guidelines are mandatory, then there should be very clear and concise conditions for applying them, as well as clear concise situations when they do not apply." (Southwest Soil Remediation, CS2P-00109)

- "EPA should not codify the contain-in principal for soils.

  It is premature for EPA to establish procedures for contained-in determinations, particularly procedures that are so prescriptive." (Rohm and Haas Company, CS2P-00114)

- "EPA Should Not Codify the Contained-in Principal for Soils

EPA proposes to codify the contained-in principal with respect to listed hazardous waste that is contained in soil. See 58 Fed. Reg. At 48127. If adopted, any detectable level of a listed hazardous waste constituent that is contained in soil would cause the soil to be managed as listed hazardous waste.

Rohm and Haas strongly objects to this proposal. First, EPA has given no basis for considering as hazardous waste all soil that contains any amount of hazardous waste. "Hazardous waste" is defined among other things, as a solid waste which

> "may…pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed."

RCRA Section 1004(5). At low constituent levels, the soil often will not present a "substantial…threat." For example, in many cases the soil may contain concentrations of listed hazardous waste metals that are lower than natural background levels of metals in soil. Additionally, the constituent levels in soil may be well below levels that can be directly ingested without posing threats to human health and the environment. Clearly such soil should not be considered hazardous waste, yet EPA's broad codification or the contained-in principal would arbitrarily do just that.

> Section 3001(b) of RCRA requires EPA to promulgate regulations…listing particular hazardous waste (within the meaning of [the definition of hazardous waste in] Section 1004(5) which shall be subject to the provisions of this subtitle [C]. Such regulations shall be based on the [hazardous waste listing] criteria promulgated under subsection (a) and shall be revised from time-to-time thereafter as may be appropriate.

This statutory provision requires EPA to make a particularized evaluation as to whether specific wastes should be listed. An across-the-board, no-specific decision to consider all soil that contains any level of listed hazardous waste constituents as having to be managed as listed hazardous waste does not meet this statutory responsibility.

Moreover, EPA cannot claim that it lacks information as to what constituent levels in soil do not pose substantial threats. EPA proposed such levels for 200 constituents under its concentration based exemption criteria (CBEC) proposal on May 20, 1992. See 57 Fed. Reg. 21510-13 (May 20, 1992). It would be arbitrary, capricious, and a violation of EPA's statutory obligations to disregard the information EPA proposed on the 200 constituents and to now consider soil with any concentration of listed constituents to be hazardous waste.

Ironically, at the same time EPA is proposing in this new rule to promulgate an over-broad contained-in rule, it is reconsidering its over-broad approach to the mixture and derived-from rules in the HWIR Forum. EPA should address the problems of over-regulation of listed hazardous waste constituents under the mixture rule, derived-from rule and contained in principal in a systematic way that rationally identifies when wastes pose substantial hazards and only regulates such wastes under Subtitle C. We seriously question the wisdom of creating another problem of an over-broad contained-in rule, at the same time that EPA is attempting to fix the problems of over-broad mixture and derived-from rules. Therefore at a minimum EPA should postpone promulgation of the contained-in rule for soils.

It is Premature for EPA to Establish Procedures for Contained-In Determinations, Particularly Procedures that are so Prescriptive

EPA has proposed very prescriptive procedures that must be followed to obtain a determination from a Region or authorized State that soil or debris that contains low levels of listed hazardous waste constituents need not be manages as listed hazardous waste. See 58 Fed. Reg. At 48127 (September 14, 1983). Rohm and Haas urges EPA to postpone adoption of prescriptive procedures it proposes.

Again, it is ironic that at the same time EPA is trying to develop a “self-implemented” alternative to the delisting procedures for innocuous mixture and derived-from rule wastes, it would propose to adopt a very prescriptive, delisting -like exit for contained-in rule wastes. The demonstration EPA proposes closely resembles a delisting demonstration in that there must be a full evaluation of waste, the affected media, the exposure potential and other site and waste characteristics. The proposed procedures are also cumbersome and time consuming, and would take away the applicant’s right to an administrative appeal. Most regrettably, EPA would require the full contained-in demonstration even if the constituent in the listed hazardous waste is well below safe edible/drinkable levels or even below natural background. It makes no sense for the applicant and agency to take the time and expend the resources on a detailed contained-in demonstration when the soils contain levels of constituents which, by all reasonable measure, would not pose a substantial threat. Certainly EPA should have some threshold concentration level below which the contained-determination should be entirely self-implementing.

The proposed contained-in determination procedure involves numerous issues that have been and are being hotly debated in the context of the mixture and derived-from rule discussions now under the HWIR Forum. If EPA were to adopt the proposed contained-in determination procedures, it would effectively trump many of the HWIR Forum discussions and establish a precedent which may be hard to overcome in the future with respect to the changes to the mixture and derived-from rules. Therefore, Rohm and Haas strongly encourages EPA to wait before it adopts the proposed, overly-prescriptive contained-in determination procedures.

The Proposed Procedure for a "Contained-in " Determination Could Prevent a Generator From Treating Contaminated Soils On-Site

The procedures as outlined present an unworkable situation for the generator who wishes to treat his own contaminated media on-site. It is generally more protective of human health and environment to treat on-site, rather than transferring the hazardous material off-site for treatment. In situations where excavation must take place immediately, such as spin remediation, the procedure proposed would be a serious impediment of the generator who wished to treat waste on site. First, the generator would have to make the 30-day advance notice to treat. Second, the generator would have to perform the treatment, and then submit a petition to the Agency stating the residual concentration levels and requesting that the contaminated media no longer be subject to the "contained-in rule." Third, the generator would have to wait another 30-45 days for the newspaper and public comment. Finally, the generator would have to wait another period of time for the Agency's final approval. By this time, the generator would be close to or over the 90-day generator period and would be required to obtain a permit which may require 3-5 years. The generator's alternative is to send the waste off-site to a TSDF, which will be more costly and which would cause more risk of exposure to the general population and the environment during transportation and off-site treatment." (Rohm and Haas Company, CS2P-00114)

- "Contained-in determinations should not require approval by EPA Regional Administrator or designee if concentrations of hazardous constituents fall below UTS.

EPA's contained-in policy states that environmental media such as soil or ground water that is contaminated with hazardous waste must be managed as the hazardous waste until the waste is separated from the media so that it no longer "contains" hazardous waste. The policy further states that contained-in determinations documenting that media no longer contains hazardous waste must be made by the EPA Regional Administrator or his designee on a site-specific basis.

Westinghouse recommends that the Agency not require petitions for wastes which meet UTS, only that the facility be required to maintain documentation for the determination in its files. Petitions should be required only if constituents present in the media exceed UTS. Implementation of this change would greatly reduce both the time and cost required to manage these materials, and would continue to minimize the risk to human health and the environment. Unnecessary impacts to regulatory Agency resources would also be avoided. EPA should further apply this concept to debris.

Under the regulatory language contained in proposed 40 CFR 268.42(c)(4), EPA proposes to add as information that may be included in "contained-in" determinations, including an "acceptable" risk range of 10^{-4} to 10^{-6}. Westinghouse suggests that EPA clarify the intent of this statement and define "risk range" further, perhaps by referencing EPA's "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final (December, 1989)." (Westinghouse Electric Corp., CS2P-00115)

- "Westinghouse does not support the petition process codified in 40 CFR 268.42. Site-specific determinations should be able to be obtained much more expeditiously than this process would allow." (Westinghouse Electric Corp., CS2P-00115)

- "**(58 FR 48156) Regulatory Language Found In Section 261.3(g)**

  This paragraph excludes soil and environmental media from regulation provided an approved contained-in determination (codified at Section 260.42) and provided the media does not exhibit a hazardous characteristic. As such, it appears that the language in the paragraph should exclude this media from Section 268 as well as the named sections "260,261 to 266 or 270". With the current language, media that is otherwise excluded from the definition of hazardous waste would still be required to meet the treatment standards in Section 268." (Westinghouse Electric Corp., CS2P-00115)

- "Hughes agrees with EPA regarding the need to codify the contained-in principal for hazardous soil. The determination, however, should be left up to the generator whenever possible. For example, if contaminated ground water is cleaned up to Safe Drinking Water Act Maximum Contaminant Levels, the treated ground water should automatically exit from RCRA Subtitle C requirements at that point. The determinations would be made by comparing constituent concentrations in the contaminated media to established hazardous waste universal treatment standards, corrective action levels, or other appropriate established standards. Alternative threshold levels could be set, as appropriate, based on the determination procedures proposed by EPA.

  Requiring petitioning of the Regional Administrator for all contained-in determinations is unnecessarily burdensome and time consuming. The proposed procedures would serve only to further delay cleanup activities by imposing additional bureaucratic bottlenecks. The result would be increased administrative costs for industry and the regulators without achieving real environmental benefits.

  Contained-in determinations should be self-implementing with a reasonable level of reporting/notification requirements to EPA or the state. Notification would be provided prior to management of the contaminated material/media as a nonhazardous." (Hughes, CS2P-00125)

- "The proposal does not clearly state that if a soil has been treated to the universal treatment standards or the hazardous soil treatment standards that it will be exempt from further management as a hazardous waste. Instead, the Administrator must be petitioned under 40 CAR 260.42. This is a cumbersome process and unnecessarily time consuming. The Agency should follow the dictum established in the Hazardous Debris regulations and allow for a simpler exit from the hazardous waste management system. If the treatment standards have been met or approved technology has been used then the material should be declared non-hazardous." (Questar Corporation CS2P-00130)

- "Uniroyal Chemical Company is concerned that the procedure outlined for determining whether environmental debris or media no longer contain a hazardous waste will not provide for a timely response by EPA. When the hazardous waste management regulations were originally implemented, many companies prepared and submitted delisting petitions under 40 CFR 260.22. Preparation of the delisting petitions required significant company resources and, in many cases, EPA did not act upon the petitions in time to allow the petitioners to cost-effective manage their hazardous waste programs. The outlined determination procedure, while valuable to the regulated community, should include a time limit for EPA to consider the petition so that valuable resources are not expended without potential regulatory relief Uniroyal Chemical believes that the contained in rule as written does not address the needs of the regulated community who manage their activities under 40 CFR 262.34 in less than 90-day facilities. Provisions for automatic extensions to storage limitations upon submittal of a request for a contained in ruling should be considered. This extension could be keyed into a specific time constraint for the agency to make its determination. This proposed rule has the potential to significantly decrease disposal costs related to spill management. Uniroyal Chemical hopes the agency will consider how to make it workable for the entire regulated community, not merely permitted TSDF facilities." (Uniroyal Chemical Company, Inc., CS2P-00140)

- "Contained-in policy. Air Products agrees that there should be ways to deregulate a material that contained a hazardous waste. We support a constituent based deregulation system based on risk." (Air Products and Chemicals, Inc., CS2P-00141)

- "We also welcome the proposal that would allow EPA Regional Administrators and authorized state program directors to make "contained-in" determinations for environmental media and debris. The proposal appears to be in accordance with the direction of the national on the HWIR/Harmonized Approach to contaminated media. Such a rule will allow environmental media and debris to exit Subtitle C regulation when such materials, either as found, or after appropriate treatment, can be shown to present little risk to public health or the environment.

  New York State and many other states have advocated regulatory reform in these area. We appreciate the opportunity to work with EPA to develop approaches that will eliminate unwarranted regulatory burdens without sacrificing protection of human health or the environment." (State of New York Department of Environmental Conservation, CS2P-00144)

- "EPA proposes to codify the "contained in" rule for contaminated environmental media, as it as already done for contaminated debris. EPA also proposes procedures for obtaining contained-in determinations for environmental media and debris by EPA Regional Administrators and authorized state program directors. Environmental media or debris, which has been determined to no longer "contain" a hazardous waste or exhibit a hazardous waste characteristic, would no longer be subject to Subtitle C management standards. The Department supports this effort and finds the proposal to be in accordance with the direction of the national debate over the HWIR/harmonized approach to contaminated media.

  The Department also supports the following aspects of this proposal;

  - The relatively flexible set of decision factors to be considered in making contained-in determinations, including an "acceptable"risk range of 10 to 10.

  - Requiring regulatory agency approval of the necessary demonstrations and avoiding a self-implementing program.

  - Utilizing petitioning procedures for parties to seek such determinations, with the associated public notice requirements.

  - Exempting activities which already come under significant public scrutiny from the procedural requirements (i.e., petitioning). However, EPA has indicated that the procedural exemption would only apply to RCRA closures and remedy selections under RCRA (corrective action) and CERCLA. This is appropriate, but it is also proposed that a similar procedural exemption be allowed for parties, remediating sites under State-issued remediation orders. Such remedy selection decisions are also subject to public notice and comment, through records of decision or analogous administrative mechanisms.

  As one final point, the subject of interstate disposal should be raised. Although it is expected that each EPA Regional Administrator will give full faith and credit to contained-in determinations made by other Regional Administrators, the same reciprocity might not necessarily prevail at the State level. It must be expected that, in the case of interstate disposal, each state will probably require that it make an exclusionary determination if the material was generated or disposed of within its borders." (State of New York Department of Environmental Conservation, CS2P-00144)

- "In our previous comments, we expressed strong support for the proposal that would allow EPA regional administrators and authorized state program directors to make case-by-case "contained-in" determinations for environmental media and debris. Such a rule would allow environmental media and debris to exit Subtitle C regulation when such materials present little risk to public health or the environment. While our support for this measure still does not alleviate the need for expeditious and comprehensive changes to the "mixture," "derived-from," and "contained-in" rules. Although these rules represented a conservative approach to environmental regulation, all three have frequently resulted over the years in misuse of the resources of both Society in general and environmental regulatory agencies by focusing attention and regulatory requirements on materials, thereby declared to be "hazardous," but which did not present sufficient risk to either public health or the environment to warrant this label.

This Department has also observed, as have many others, that the "derived-from" rule, in particular, provides one of the more significant disincentives to recycling and reuse of listed wastes. In many cases, this rule causes residues from the reclamation or production process to also become listed hazardous wastes, even though they may contain little or no hazardous constituents and pose little risk. The same also applies to residues generated by the burning of listed wastes for energy recovery. With regard to recycling and reuse situations, this Department has urged EPA to codify an "indigenous" rule that authorized states could administer. This would allow listed secondary materials to cease being solid wastes upon entering a process that legitimately reclaims, uses, or reuses the hazardous constituents. Residues from the process, if not independently listed, should then be evaluated only in terms of hazardous waste." (State of New York Department of Environmental Conservation CS2P-00149)

- "<u>Contained-In Determinations</u>

DWP is opposed to the proposed mechanism of having authorized agencies take the determination that a given soil no longer contains a listed hazardous waste and is, therefore, no longer contains a listed hazardous waste and is, therefore, no longer hazardous. It seems unnecessary to have an agency make such a determination when the proposed treatment standard for soils is in place. In many instances, generators already have the responsibility of determining when a waste is hazardous or nonhazardous; why not extend that responsibility for contaminated soils? Generators should be allowed to determine that the soil is nonhazardous if all the hazardous constituents are below the treatment standard.

DWP also suggests that EPA consider the application of certain treatment technologies as a method of the delisting hazardous soils. This will eliminate the need for expensive and time-consuming analyses.

DWP supports EPA's effort in establishing decision factors/criteria for obtaining contained-in determinations for contaminated soils. However, DWP believes that these criteria and petition processes should be made applicable only to sites requiring a variance from the proposed treatment standard because the contamination is extensive or the soil cannot be treated to meet the proposed standard. In such cases, having an authorized agency, a petition process, and decision factors/criteria to make a "contained-in" determination seems more appropriate." (Department of Water and Power the City of Los Angeles, CS2P-00155)

- "TU supports EPA's codification of the "contained in" principal. This constitutes a set of procedures and criteria to determine, on a case by case basis, concentration levels in soil below which it will no longer have to be managed as hazardous waste. TU believes this would greatly simplify the cleanup process.

  "TU requests that EPA amend the proposal to provide that soils meeting the LDR treatment standard for soil are automatically removed from hazardous waste regulation. This is currently the procedure for contaminated debris. TU believes the petition process should be solely reserved for soils that are above the treatment standards." (Texas Utilities Electric Company, CS2P-00156)

- "EPA Should Provide for Automatic Delisting of Soils That Meet "Minimize Threat" Standards.

  EPA has requested comment on its proposed mechanism for making determinations that contaminated soils no longer contain a hazardous waste. Under the Agency's proposal, such determinations would be made on a case-by-case basis after consideration of such criteria as the nature of the media and contaminating constituents an the proposed disposal site. 58 Fed. Reg. at 48127-28. Such determinations could be made by the lead Agency at CERCLA or RCRA remediation sites or through a petition process at other sites. Id.

  While USWAG agrees with the Agency that a method must be found to streamline the "contained-in" determination for soils, the Agency's proposed approach will not achieve that goal. Experience with the Agency's delisting procedures and other hazardous waste variance processes indicate that such case-by-case determinations require the generation and submission of copious amounts of data and take months and often years to complete. Therefore, USWAG believes that the proposed procedure for making "contained-in" determinations for contaminated soils will be such a long and cumbersome process that it will not provide a meaningful mechanism to remove soils from hazardous waste regulation in a sufficiently timely manner to be of use in non-CERCLA or RCRA language. A lengthy petition process would simply become a regulatory disincentive to voluntary cleanups.

  USWAG therefore urges the Agency to provide that soils that meet the treatments standard for soils established under the LDRs automatically be deemed to no longer contain the hazardous waste. By definition, the LDR standards are set at those levels that minimize threats to human health and the environment and as much of the hazardous constituent has been removed as is possible to achieve with demonstrated and available technology. RCRA Section 3004(m). The contaminating hazardous waste has been removed from such soils to the greatest extent possible and it makes no sense to continue classifying such soils as "containing" hazardous waste.

Establishing numerical standards (or required treatment technologies) for contained-in determinations would allow remediations to proceed in as expeditious a manner as possible and would relieve persons conducting such remediations of the burden of either managing soil that poses no genuine risk to human health or the environment as hazardous waste or making an extremely burdensome showing to obtain a determination that the soil no longer contains a hazardous waste. USWAG's suggested approach would also remove a substantial disincentive that currently exists to conducting remediations, which is the potential cost and difficulty of managing excavated soils as hazardous wastes even after they have been treated to meet the "minimize threat" standard. The establishment of automatic delisting levels would enable parties responsible for site remediation to excavate soil, treat it in 90-day tanks, containers or containment buildings, and replace it in the excavation without triggering hazardous waste permitting requirements. The ability to manage soils in this manner would reduce both the time and expense needed to perform a remediation without sacrificing environmental protection.

EPA has already adopted this approach for contaminated debris, 40 C.F.R. Section 268.45(c), and many generators have successfully used this exclusion to treat debris in an environmentally sound and economically reasonable manner. A similar approach would be equally beneficial for generators of contaminated soil and USWAG urges EPA to adopt it." (Utility Solid Waste Activities Group, CS2P-00162)

- "<u>BP Oil supports EPA's decision to defer consideration of contained-in policy provisions to the HWIR rulemaking.</u>

  EPA's contained-in policy determines specific constituent concentrations at which media at a specific site no longer "contains" hazardous waste and is no longer subject to Subtitle C requirements. For practicality purposes, the contained-in process must be considerably simpler than the existing hazardous waste delisting process. In addition, EPA should determine that the contained-in level is also the "minimize threat" level, so soil, once it meets the prescribed constituent levels, can be reused. There is a great need to be able to reuse remediated soil within a particular plant site, for example, a petroleum refinery, prior to final closure of that site.

  A number of states have already instituted either regulatory-based or policy-based soil cleanup requirements. Coordination of these requirements with EPA contained-in policy provisions is necessary in order that the regulated community obtains practical relief when managing hazardous soil. The HWIR process and pending “harmonized approach” appear to be able to provide the necessary coordination and accommodation since below the Bright line material will be regulated outside of the Subtitle C system by the overseeing agency which will be the state agency in most cases.” (BP Oil, CS2P-00163).

■ “A. **The Contained-In Principle**

In the September 14 notice, EPA proposed to codify the “contained-in” principle for hazardous soil and other environmental media, whereby site-specific factors would be taken into consideration to determine the concentrations at which contaminated media would no longer “contain” hazardous wastes, and therefore would no longer be subject to RCRA Subtitle C management standards. 58 FR 48127 (September 14, 1993). EPA previously codified the “contained-in” principle for hazardous debris in an August 18, 1992 rulemaking. See 57 FR 37194, 37225 (August 18, 1992). The RCRA Corrective Action Project strongly supports this recognition by the Agency of the need for a mechanism for contained-in determinations.

In the soil BDAT proposal, EPA set forth specific factors, applicable to both hazardous soil and debris, to be used in making such determinations. To the extent that contained-in determinations are now available informally, they have proven to be of great benefit in fostering early and cost-effective remediation. However, the project cautions that the introduction of a highly formalistic process for making contained-in determinations Could adversely impact the timing, cost, and feasibility of obtaining such determinations, thus jeopardizing the Agency’s goal of expeditious management of hazardous waste-contaminated media. Several suggestions with regard to implementation of the contained-in policy so as to avoid these eventualities are discussed below.

1. The Contained-in Principle Should be Implemented Via Guidance Rather than by Codification

At the outset, the RCRA Corrective Action Project encourages EPA to codify the contained-in principle for hazardous soils and other environmental media, but to do so in a general fashion similar to the authority granted to the Regional Administrator in the contaminated debris rule to make such determinations. In that August 18, 1992 rulemaking, EPA codified the contained-in principle for hazardous debris by stating simply that such debris need no longer be managed under RCRA Subtitle C where “the Regional Administrator, considering the extent of contamination, has determined [that it] is no longer contaminated with hazardous waste.” See 57 FR 37264 (to be codified at 40 CFR 261.3(f)(2)).

However, to preserve timeliness and flexibility in implementing the contained-in principle, the factors used in making such determinations should be addressed in Agency guidance rather than by codification. Furthermore, it has been our universal experience that well-intentioned, but overly structured processes, such as the formal petitioning procedures established for delisting, have ironically served to hamper timely decision making.[25] The Project members would be most interested in providing constructive input to EPA on the appropriate factors to be considered in developing comprehensive guidance for contained-in determinations.

2. Contained-in Levels Should be Site-Specific

The RCRA Corrective Action Project is particularly encouraged that the Agency recognizes that contained-in determinations for contaminated environmental media should be made on a site-specific basis, with a considerable degree of flexibility. As EPA noted in its preamble discussion, the extreme variations in site and waste characteristics necessitate a flexible implementation process. 58 FR 48127. To this end, EPA has proposed a number of factors to be considered by the implementing agency in determining the appropriateness of a contained-in decision. Id at 48127-128. Outlined below are the Project's concerns with respect to certain of these factors.

a. The Estimated Risk Range for Contained-in Determinations

In its preamble discussion, EPA lists as one of the factors that the Administrator may consider when making a contained-in determination an "acceptable risk range of 10^{-4} to 10^{-6}." 58 FR 48128. In other words, the point at which environmental media would no longer "contain" a hazardous waste is where human exposure is reduced such that the incremental upper bound lifetime cancer risk presented by the media is one incidence of cancer per 10,000 exposed population to one incidence of cancer per million exposed population. The Project members support the use of risk ranges to provide the necessary flexibility to balance site-specific and other considerations in contained-in determinations. As the Agency noted in the preamble discussion, "EPA is proposing to adopt specific formulae or other quantitative means of calculating appropriate contained-in levels. The Agency believes that considerable flexibility must be allowed for such decisions, if the process is to be workable." 59 FR 48127.

b. Only Plausible Exposure and Future Use Scenarios Should be Evaluated

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[25] Indeed, the Agency's *RCRA Implementation Study* noted that "EPA's system for "delisting" (i.e., designating certain listed hazardous wastes as nonhazardous) is slow, onerous, ineffective, and at times, controversial." See *The Nation's Hazardous Waste Management Program at a Crossroads - The RCRA Implementation Study*, Office of Solid Waste and Emergency Response, July 1990, p. 39.

Another factor that EPA lists as bearing on contained-in determinations is the potential for adverse human and ecological exposure to hazardous constituents. EPA has concluded that "all possible exposure pathways" should be evaluated in determining the appropriate contained-in levels. 58 FR 48127. Attempting to evaluate "all possible exposure pathways," no matter how incredible, would result in unrealistically and unachievably low contained-in levels which would eviscerate the purpose of the contained-in concept.[26] Such an approach would lead to the sort of unrealistic, hypothetical risk evaluations which have been the target of so much criticism in the Superfund program.

In addition, at the program level, if not always in individual site cleanups, EPA has historically recognized that the future use of a facility should have a bearing on remediation-related decisions. For example, in the preamble to the proposed Subpart S Corrective Action rule, EPA stated that "groundwater that is not a potential source of drinking water would not require remediation to a 10^{-4} to 10^{-6} level…" 55 FR 30798, 30826 (July 27, 1990).

The RCRA Corrective Action Project urges the Agency to promote the use of reasonable and plausible exposure and future use assumptions when making these highly variable, site-specific determinations. The utility of contained-in determinations is dependent upon a realistic evaluation of potential exposures and attendant risks.

If the exposure scenarios and factors used are overly stringent (e.g., use of a residential direct exposure scenario where the facility is a fenced, guarded industrial site surrounded by other industrial sites), EPA will make the contained-in concept useless for any real-world applications. Similarly, if contained-in determinations are unnecessarily and overly stringent, few on-site treatment technologies will be able to achieve the levels and on-site management and remediation or capital projects will be seriously hampered. To avoid this result, the RCRA Corrective Action Project urges the Agency to adopt the following clarifying language:

> The assumption of a residential exposure scenario at all sites is inappropriate. Use of an industrial exposure scenario is appropriate where the current zoning of the property is industrial, is anticipated to be industrial, or where the current industrial use is a legal, non-conforming use. This may include zoning designations, depending on the community, such as "light industrial" or "heavy industrial."

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[26] In addition, EPA should not elevate ecological risks to a priority factor where the lack of available scientific data for such determinations could significantly delay the decision making process and circumvent the Agency's overarching goal of remediating contaminated media expeditiously. Remediation to protect human health should be the first priority, and in many instances would address significant environmental impacts.

The Project notes that in most cases, RCRA sites are zoned for industrial or legal, non-conforming uses. Therefore, residential exposures scenarios are clearly inappropriate except to address contamination that has migrated off-site.

Moreover, if unrealistic residential exposure scenarios and hypothetical multi-pathway analyses are applied, the resulting contained-in levels could unnecessarily be driven below existing BDAT. Furthermore, the application of inappropriate exposure scenarios can result in contained-in levels that are orders of magnitude more stringent than necessary to protect human health. This point is illustrated by the following concentration levels for residential and industrial exposure scenarios, developed under the Michigan Environmental Response Act of 1982, Mich. Comp. Laws. Ann. Section 299 (West 1984 and Supp. 1993):

	Health-Based Drinking-Water Value (ug/l)		Soil Direct-Contact Value (ug/l)	
	Residential	Industrial	Residential	Industrial
Benzene	1	12	10,000	85,000
Toluene	1,000	4,600	2E+07	3.3E+07
Tetrachloroethylene	0.7	6.8	8,000	49,000
1,1,1-Tri-Chloroethane	200	580	2E+06	4.2E+06
Trichloroethylene	3	22	40,000	1.5E+05
PCBs	.02	.17	1,000	7,500

Clearly, using residential exposure scenarios in an industrial setting would result in far more contaminated media being managed in the Subtitle C program than necessary. Conversely, determinations based upon realistic site-specific risk considerations would yield contained-in levels that would: (1) allow the use of innovative technologies capable of meeting the more realistic levels; and (2) avoid needless focus on low hazard media. Therefore, EPA must ensure that unrealistic assumptions are not used, and that exposure factors reflect site-specific conditions and reasonably foreseeable land uses.

c. Plausible Management Scenarios are Relevant to Contained-in Determinations

In the September 14 preamble discussion, EPA stated that management scenarios would not be considered in deciding the appropriateness of contained in levels.[27] 58 FR 48128. The Project members note that by refusing to consider site-specific management scenarios in such determinations the Agency is actually assuming, albeit by default, a management scenario (e.g., uncontrolled access and exposure) to define its exposure assumptions. Accordingly, the Project urges the Agency to reconsider its position. How contaminated media will be managed and disposed (e.g., access and/or institutional controls, off-site Subtitle D landfill, or engineered on-site unit) is a key element in defining reasonable site-specific exposure assumptions for ascertaining contained-in levels. Obviously, the long-term reliability of the intended final management option would also be a significant consideration. Needlessly over-stringent contained-ion levels would limit the application of both innovative treatment technologies and on-site treatment, and could drive those seeking contained-in determinations to the use of thermal technologies.

3. RCAP Supports the Agency's Decision Not to Require Separate Contained-in Determinations for RCRA Corrective Actions and Superfund Remedial Activities

The members of the RCRA Corrective Action Project agree with the Agency's decision not to require a separate process for contained-in determinations when cleanups are being pursued under EPA's RCRA corrective action or Superfund remedial authorities. Furthermore, it is obvious that there would be no need for a separate "contained-in" determination with respect to contaminated media above the HWIR "bright line," as such remedial activities will be undertaken with substantial EPA oversight and input. In that regard, the Agency should also clarify that because wastes falling below the HWIR "bright line" would not be subject to Subtitle C in any event, no "contained-in" determinations would be necessary with respect to them. To require a separate determination under any of these enumerated circumstances would needlessly and redundantly delay implementation and increase the cost of remedial measures.[28]

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[27] It appears that the Agency has based its decision not to consider management scenarios in contained-in determinations on an erroneous interpretation of the DC Circuit Court's opinion in American Petroleum Institute v. US EPA, 906 F.2d 729 (DC Cir. 1990). In that case, the court interpreted RCRA section 3004(m) to require "treatment, i.e., a BDAT, [to] substantially diminish the toxicity of a waste or substantially reduce the likelihood of the migration of its hazardous constituents prior to land disposal." Id. at 736. Put another way, RCRA section 3004(m) precludes the treatment of hazardous waste subsequent to land disposal to meet the section 3004(m) "minimize threat" level. However, the court's opinion does not preclude post-treatment land disposal management scenarios from being considered in determining the appropriate "minimize threat" treatment level. In fact, the court emphasized that, "if a party meets the pretreatment standards set out by section 6924 and requests permission to subsequently place the treated waste in a land treatment facility, we would interpret section 6924(m) as compelling EPA to grant that request." Id at 736-737, fn. 8.

[28] Furthermore, the Agency should clarify that a separate "contained-in" determination would not be required for cleanups associated with the Underground Storage Tank program, RCRA closures, or any other remedial activity where the Agency, by rule and/or order, already exercises a considerable degree of oversight.

However, owners and operators preferring to conduct remedial activities on a truly voluntary basis should be able to utilize the contained-in procedures so as to expedite such activity.

4. Contained-in Determinations Should be Subject to Administrative Appeal

The Agency stated in the preamble discussion at page 48128 that contained-in determinations would constitute final Agency action and would not be subject to administrative appeal. The Project members believe that EPA should allow for administrative appeals in this context because such determinations are complex and can have a significant impact on remedial activities at a site. In addition, to limit appeals to the judicial arena is unnecessarily restrictive and presents the potential for protracted legal proceedings which could ultimately delay progress more than an efficient administrative appeal process. Accordingly, the Project members urge the Agency to consider utilizing an administrative appeal process such as the one sanctioned by the Environmental Appeals Board in <u>In re. General Electric Company</u>, RCRA Appeal No. 91-7 (EAB, April 13, 1993), whereby owners/operators are given the opportunity to have their objections heard by EPA staff overseeing remedial activities and by a final Agency decision maker. Note, however, that the Project is in agreement that the conclusion of this appeal process must constitute "final agency action" for purposes of judicial review." (RCRA Corrective Action Project, CS2P-00164)

- "The LDEQ prefers that the criteria for the determination of "contained-in" listed in the preamble must be addressed for all contained in determinations. This is needed to keep all determinations consistent across all types of sites requesting determinations, and to keep all decisions consistent." (Louisiana DEQ, CS2P-00167)

- "'Contained-In' Determination

  AIHC's comments at this time focus on the "contained-in" determination mechanism which was part of the proposal for treatment of hazardous soils on the September 14, 1993 FR notice. AIHC strongly supports the proposal to use a site-specific risk-based approach to determine when 'contaminated media' no longer contain hazardous constituents at a level such that the media itself must be considered hazardous. Further, the AIHC agrees with the decision not to define specific formulae for this determination. As set out by proposal, considerable flexibility must be maintained in the process because of the 'extreme variations in site-specific and constituent-specific characteristics' of contaminated soil.

  In lieu of a specific formulae, the proposal provides a set of decision factors that should be considered on a site-specific basis. AIHC concurs with the Agency that the factors proposed are appropriate and that a more specific 'list' or set of 'conditions' are not required. Specifically, the AIHC agrees with the need to consider site-specific (e.g., soil conditions, groundwater hydrogeology, surface waste conditions, climatic conditions, land use, potential receptors) and waste-specific characteristics (e.g., solubility, mobility, degradation, toxicity interactions) which may determine the environmental fate of the hazardous constituents and the likelihood of impact of human or environmental receptors. AIHC also encourages the use of a range for determining 'acceptable' risk.

AIHC also urges that guidance on the use of the risk assessment approach for contained-in determinations be given to the EPA regional offices which administer this program. AIHC recommends that the use of state-of-the-art science methodology (that is, the inclusion of probabilistic modeling as opposed to worst-case default assumptions, the use of environmental fate and transport modeling,, the appropriate land-use scenarios) be specifically addressed in this guidance.

It is AIHC's position that risk assessments should be based upon realistic exposure scenarios that assume current or future land use, incorporating any changes resulting from earlier response actions known or planned. When available, site-specific exposure and pathway information, including actual data, should be used to the maximum extent possible. Not all risk assessment parameters need to be site-specific, however. Probabilistic distributions for certain generic human parameters (e.g., body weight and air intake) that do not vary from site to site are such exceptions. Factors affecting the choice of exposure scenario (pathway), the distribution of the contaminant in the media, the characteristics of the media, and the activity patterns and demographics of the surrounding populations should be considered, whenever possible, as site-specific concerns.

Finally, any uncertainty in the assessment itself must be clearly communicated, including the impact of key assumptions. This is best accomplished with the use of probabilistic modeling, which can be used to address the uncertainty and variability in all exposure assumptions. Point estimates are useful, particularly for scoping assessments; however, parameter values should be based on relevant site conditions. The use of informed best professional judgment to fill data gaps as an improvement over automatic reliance on fixed, worst-case default assumptions should be encouraged. Again, the use of these judgments must be made explicit to the risk manager." (AIHC, CS2P-00168)

■ "'Contained-in' Determinations

API agrees with EPA's conclusion that the codification of the 'contained-in' principle should be addressed as part of the comprehensive review of the regulatory framework for contaminated media in the HWIR proposal. API offers the following comments on the 'contained-in' principle as it currently exists, and urges the Agency to address these concerns as it develops the HWIR proposal.

API continues to oppose the ‘contained-in’ policy insofar as it implicates environmental media that contain very small amounts of hazardous constituents. As both EPA and the regulated community recognize, the contained-in policy -- and the mixture rule which it mimics -- is overly broad, and captures materials within the Subtitle C program that do not ‘pose a substantial present or potential hazard to human health or the environment.’ (RCRA Section 1004(5)). To remedy this situation, API believes that there should be a level at which soil no longer ‘contains’ a listed hazardous waste and therefore is no longer subject to the RCRA Subtitle C requirements. Consequently, any future codification of the ‘contained-in’ policy should regulate soils as if they were hazardous wastes only where they <u>truly</u> pose a hazard to human health and the environment.” (API, CS2P-00169)

- “Westinghouse Electric Corporation (Westinghouse) offers the following comments on the Agency’s proposal to defer promulgation of the Contained-In Rule portion of the proposed Land Disposal Restrictions for Newly Identified and Listed Hazardous Wastes and Hazardous Soils (58 FR 48092). This proposal deferral was published in the Federal Register on March 8, 1994 (59 FR 10778). These comments are in addition to the comments Westinghouse previously made, dated November 15, 1993.

  The EPA, in 59 FR 10778, indicated it believes the ‘contained-in’ concept ‘is one of the key issues that must be addressed in the development of a comprehensive regulatory framework for management of contaminated media.’ Based on this premise, the EPA is proposing to not codify the Contained-In Rule, as proposed in 58 FR 48092, and, instead, will address the Contained-In Rule at a later date in the context of the HWIR rulemakings.

  Westinghouse is concerned that postponing promulgation of the Contained-In Rule until the HWIR rulemaking is complete will unnecessarily delay and increase the cost of cleanup activities. The EPA should not further delay codification of this most basic of EPA policies. Linkage of this policy to the HWIR will only delay its use by authorized states that are reticent to use ‘policy’ rather than regulations. Codification in a manner consistent to that provided for debris (57 FR 37194) will provide structure to state implemented programs to accommodate exclusion of many low-hazard soils from Subtitle C regulation. Management outside Subtitle C of ‘contained-in’ soils, that have only traces of listed wastes, will also conserve limited Subtitle C disposal capacity for higher risk soils. Furthermore, the incremental money spent on Subtitle C disposal until the HWIR rulemaking is complete could be better used to complete other remediation projects.” (Westinghouse, CS2P-00170)

- “We also view the suggestion in the Proposal to tie ‘contained-in determinations’ to the arbitrary proposed treatment standards as adverse to sound environmental and public health policy. By federalizing the contained-in policy through incorporation in a HSWA-driven rulemaking, the Agency threatens to usurp authorities historically vested in individual states who have, almost without exception, elected to accept the role of regulating waste characterization under RCRA. (In footnote: The Agency should note that the contained in policy is concerned primarily with waste identification, not with subsequent treatment. Despite the Agency's action in setting alternative standards for hazardous debris, whether the EPA has stringent is a matter of some doubt. In our view, the action lacks a sound basis in policy. If the EPA's objective is to facilitate clean-up at CERCLA sites by providing administrative relief from the ARARs, Congress has already provided such a means in CERCLA itself.)" (USPCI, CS2P-00171)

- "<u>The EPA Should Codify the Contained-In Policy However, the Effective Date Should Be Delayed or the Regulation Modified to Maintain the Policy Authority in Authorized States. Contained in Determinations Should Not Be Linked to the Proposed Soil Standards</u>

  USPCI believes that it may be appropriate to codify the contained-in policy to provide clear guidance regarding what factors bear on contained-in determinations and how those may be applied. By codifying the policy, the EPA creates an obligation for States to promulgate a corresponding requirement within two years to retain their authorization. Regulations promulgated under RCRA authority do not become effective in authorized States until the State adopts them or promulgates and equivalent regulations. However, regulations promulgated pursuant to the HSWA are effective in every State upon Federal promulgation and may only be implemented by the EPA until a state becomes authorized. For reasons related to applicability, it is therefore important to understand whether the contained-in policy is being codified pursuant to the HSWA or the RCRA or both statutes together. The Proposal is unclear as to which authority the EPA views its action as falling within. Although RCRA provides the clearest authority, it is conceivable that the Agency could view the proposal as HSWA-based. (In footnote: We believe that HSWA does not provide any direct authority to promulgate the contained in policy and that the contained-in policy codification must be founded in RCRA alone.) Depending on the EPA's viewpoint and whether the Agency elects (inappropriately) to tie contained-in determinations may become an irreconcilably mixed question of State and Federal law. (In footnote: It is well settled that EPA lacks authority to enforce the Federal program in an authorized State.)

  We are concerned that if the EPA views its action as resting on HSWA in any part, individual states will lose the flexibility they have exercised in the past in addressing site-specific waste management problems and that all such determinations will be transferred to an EPA that is ill-prepared to handle the task. It appears that the Agency views the proposed codification as grounded solely in RCRA. The EPA should clarify that point in a final rulemaking to avoid the situation where states are deprived of their traditional authority and responsibility by a procedural anomaly in the enabling statute. In the alternative, the EPA should delay the effective date of the codified policy. No policy interest would be impaired by such an action. The contained-in policy currently in place would continue in effect, and nothing would prohibit individual states' reliance on the regulatory factors proposed. In the alternative, the Agency should modify the regulation to provide that, in states authorized to implement the federal program under part 261. This regulation is within the Agency's authority and would prevent loss of traditional state roles and continue to assure that those persons most knowledgeable about site-specific factors affecting contained-in determinations remain involved in those decisions.

We disagree strongly with the suggestion that the proposed soil treatment standards should be linked to contained-in determinations. Although the EPA notes that there is no absolute bar to both the minimized-threat level and the contained-in level occurring at the same numerical value, the proposed soil standards do not minimize threats to human health and the environment. This is certainly true as a matter of federal policy because it would apply without regard to site-specific characteristics. Moreover, the actual numerical standard achieved in compliance with the proposed soil standards is, at best, a floating value ranging between the UTS value and ten times that number. Thus, the value ultimately achieved is completely speculative. For some constituents with large UTS base values, the difference between the number the EPA has determined is actually achievable and the value actually achieved can be several hundred ppm. For example, the UTS base value for contained-in non-wastewaters is 160 ppm. Under the most restrictive proposed soil standard, a soil contaminated with as little as 1.6% acetone would be treated to comply with the proposed standards when it contained 1600 ppm residual acetone. (In footnote: We suppose the Agency could respond with the inappropriate argument that a soil is unlikely to contain 1.6% acetone because acetone is volatile and much of a material spilled could escape to the ambient air. Acetone is merely a convenient example because it appears as the first constituent on the UTS table. Similar values apply in the case of less volatile and constituents including, Dinitro-cresol , Dinitro-phenol and Methyl methacrylate. It should be noted that these high LDR values drive principally from difficulties in analyzing the constituents at lower levels in waste matrices. Thus, the values say very little about the actual treatability of these constituents. Instead, the values reflect present limitations concerning determinations of treatment effectiveness. When an arbitrary factor, even under the 90% and 10XUTS scenario, is applied compliance with the LDR standards will be attained within ranges where concentrations are measurable with confidence. It is these actual numeric values upon which any contained-in determination should be based–not on a value that represents as much as ten times the limit of our analytical uncertainty.)

Even at individual sites, equating contained-in determinations with the proposed soil standards is not justified. The UTS standards are BDAT standards. Thus, they are based on the performance of technology, not on the incidence of risk. Contained-in determinations, however, are based solely on an inquiry into the risks presented by particular constituents at a particular site. A standard that conveys, for example that technology X can optimally produce residues containing Y ppm of constituent Z says nothing about the risks posed by constituent x or about whether a soil continuing constituent x at that level should be regarded as a hazardous waste.

USPCI believes that the proposed factors proposed as considerations in contained-in determinations are generally reasonable. However, we do believe that risk levels in the 10^{-4} range are unacceptably high." (USPCI, CS2P-00171)

- "Westinghouse Savannah River Company (WSRC) encourages EPA to codify the contained-in policy without further delay. Currently, determinations as to whether or not contaminated media "contain" hazardous waste are made by the individual EPA regions or authorized states, often with no consistency between regions or states. WSRC believes that codification oft he contained-in policy would establish a subjective, consistent method for determining whether contaminated media are subject to Subtitle C regulation." (Westinghouse Savannah River Company, CS2P-00174)

- "Dow supports the Agency's proposal to make contained-in decisions on a site specific basis without set criteria, specific formulae or quantitative means of calculation. The process should appropriately consider the actual disposal site for the treatment residue, i.e., it should consider how the waste will be managed. We feel that such considerations should also not prohibit off-site placement of the treatment residue in certain cases.

  The agency should also establish criteria, or concentrations which would allow self-implementing contained-in determinations. Such a procedure is necessary to avoid either 1) the massive amount of paperwork required to handle the petitions necessary to conduct the large number of diverse clean-ups that will be taking place, or 2) the tendency to simply leave waste in place rather than handle it and go through the full procedure of applying for a contained-in determination. Such self-implementing levels should be risk based; the "bright line" levels that are a part of the HWIR discussion could either serve this purpose or they could actually reduce or eliminate the need for contained-in decisions since any waste with concentrations below those levels may not be hazardous wastes. Other possibilities for self-implementing contained-in levels could be 10 x UTS level, the UTS level, soil screening levels or Subpart S levels. At a very minimum detection levels using SW-846 methods should be established as self-implementing contained-in applications." (The Dow Chemical Company, CS2P-00184)

- "CONTAINED-IN DETERMINATIONS MUST ACT TO EXEMPT MEDIA FROM LDR STANDARD UNDER PART 268; FURTHER, PART 268 'MINIMIZE THREAT' LEVELS MUST BE RISK BASED AND TAKE INTO CONSIDERATION

MANAGEMENT PRACTICES. Dow supports the use of site-specific ‘decision factors’ to be considered when making contained-in determinations. (See for example, the list of factors at p.48127-128 of the Proposed Rule, 58 Fed.Reg. 48092, September 14, 1993). Dow believes that a base-line criteria should be established, under which, if the criteria are met, a contained-in determination would be self implementing. Only if the base-line criteria were not met would a petition be necessary. Under a petition, the Administrator would consider the site-specific decision factors in making the contained-in determination. An affirmative decision under the contained-in program, whether sel-implemented or by petition must act as an exit from hazardous waste regulations and from LDR standards. Contained-in and minimize threat levels are not necessarily the same.

Dow strongly object to EPA’s claim that minimize threat levels may not consider management practices. Such a claim, which the agency backs with a weak reference to RCRA §3004(m), flies in the face of EPA’s own actions and does not comport with RCRA §1004. EPA moved to exempt from subtitle C regulation contaminated media from underground petroleum tanks. To quote EPA’s own language on why management practices are properly considered:

> Section 1004 of RCRA defines a ‘hazardous waste’ as a solid waste which may pose a substantial threat ‘when improperly***managed.’ In addition, section 3001 of RCRA authorizes EPA to determine whether subtitle C regulation is appropriate in determining whether to designate a waste as ‘hazardous.’ EPA thus may determine that subtitle C regulation is not appropriate because such wastes are not ‘hazardous’ when properly managed and, based on existing regulatory programs, would not be mismanaged. Under this approach, regulation of UST petroleum-contaminated medal and debris under subtitle C is not necessary to protec human health and the environment, due to the presence of the Federal subtitle I regulations for underground storage tanks and the UST programs that are active in each of the States. (58 Fed. Reg. 8504, 8507, February 12, 1993).

This matches perfectly with contaminated soils that would be managed under a codified contained-in policy or a minimize threat determination. More importantly, it makes sense from the viewpoint of protection of human health and the environment. It would be counterproductive to a goal of environmental protection not to consider management practices under minimize threat determinations. EPA’s proposal not to consider management practices merely builds one more unnecessary roadblock to effective remediation and protection of human health and the environment.” (Dow, CS2P-00184)

Response: The commenter notes a ‘weak’ reference to section 3004 (m) as justification for why management practices may not be considered in granting contained in determinations, and further argues that minimize threat determinations should not be established at lower levels than contained in levels. First, both the legislative history to section 3004 (m) states emphatically that engineered barriers are not to be considered in determining if threats have been minimized, due to the inherent uncertainties in assessing long-term effects of land disposal of hazardous wastes. S. Rep. No. 98-284 at 15; H. Rep. No. 98-198 at 38. The D.C. Circuit has likewise held that threats must all be minimized before land disposal occurs. API v. EPA, 906 F. 2d at 735. EPA thus has no doubt that its position is fully supported by statute, and does not rest on weak authority. In response to the comment that contained in levels cannot be greater than minimize threat levels, EPA again disagrees. As the commenter notes, contained in determinations are presently made on a relatively ad hoc basis. There are desirable reasons for this degree of flexibility. However, a consequence of such an uncodified and unquantified regime is that EPA is unable to find that the determinations adequately result in levels that minimize threats to both humans and to the environment.

- "DOW OBJECTS TO THE AGENCY'S CLAIM THAT CONTAINED-IN DETERMINATIONS WOULD NOT BE SUBJECT TO THE RIGHT OF ADMINISTRATIVE APPEAL. 58 FED. REG. 48128, SEPTEMBER 14, 1993. Administrative appeals serve a basic function in our system of government by allowing appeals of actions by bureaucratic agencies that the aggrieved party believes to be arbitrary, capricious, an abuse of discretion or otherwise contrary to law or regulation. They also serve to help conserve scarce judicial resources and to make more effective use of the resources of both the regulated party and the agency. Administrative appeals are a fundamental right that EPA cannot simply wish away in a heavy-handed attempt to deflect objections to Agency decisions that critically affect the legitimacy, costs and effectiveness of environmental remediation efforts. The mere fact that EPA has made such a bald attempt to cut off the right of administrative appeal is a strong argument to ensure the affirmation of the right. Despite the Agency's desire to limit the rights of the regulated community, that does not translate into an arbitrary authority to do so. The agency must affirm the rights of the regulated community to administrative appeal." (Dow, CS2P-00184)

- "Paragraph VIII.D, page 43127, Contained-in Determination. The proposed rule requests comments on the approach for a "contained-in" determination, decision factors to be used, the procedures for making determinations, and the proposed linkage to treatment standards and RCRA Subtitle C exclusion levels.

  a. Linkage to RCRA Subtitle C exclusion levels. The Army supports a three tier system as proposed for hazardous waste under the Hazardous Waste Identification Rule in the 20 May 92 Federal Register. The tiers would be established by health based standards for each hazardous constituent. Hazardous media with constituent concentrations above the upper limit (tier 1) after treatment would remain regulated under RCRA Subtitle C.

  Hazardous media with constituent concentrations below the lower limit (tier 3) would be excluded from RCRA Subtitle C regulations. Hazardous media with constituent concentrations between the upper and lower limits (tier 2) would petition for a RCRA Subtitle C exclusion determination.

(1) Media with constituent concentrations in the lower tier (tier 1) would automatically be excluded from RCRA Subtitle C regulations and should only require a notification and not a petition. This waste would no longer "contain" hazardous constituents. The "contained-in" determination would be self implementing.

(2) Media with constituent concentrations in the middle tier (tier 2) would petition for a RCRA Subtitle C exclusion determination. The petition could be for a "contained-in" determination so the media could be left on site or for a "management" determination that places requirements on how the media is managed when disposed.

b. Hazardous Debris. The same determination procedures proposed for hazardous media are also proposed for hazardous debris. The three tier system should also apply to hazardous debris. Hazardous debris with constituent concentrations in the lower tier (tier 1) would automatically be excluded from RCRA Subtitle C regulations and should only require a notification and not a petition. This determination should be self implementing. Hazardous debris with constituent concentrations in the middle tier (tier 2) would petition for a RCRA Subtitle C exclusion determination.

c. Decision Factors.

(1) Statistical comparison to background levels in the proposed "contained-in" determination should be included. The Army believes there should be a provision in the proposed exemption rule to make statistical comparisons to background levels. Otherwise, a media could be classified as a hazardous waste due to the naturally occurring concentration of a constituent and not because of past "generator" activities. The proposed rules imply a facility may be required to remediate a particular constituent to a concentration below its naturally occurring concentration in the soil. The generator may not have spilled any material on the soil with this particular constituent. Without this provision facilities may not be able to meet an exemption criteria.

(2) Direct human contact (ingestion) with the soil should not be used as a decision factor in all cases for determining exemption levels. Unconstrained disposition of contaminated media should not be assumed in all cases. Hazardous waste and most solid waste facilities have security systems which control access to the site. Along with access control, future use of the land should be considered before assuming direct human contact when determining exemption levels.

(3) Site specific criteria, such as low hydraulic conductivity and area locale, should be factored into the decision making. This should not create a significant burden to

regulatory agencies. Many remedial investigations are already conducted under regulatory supervision either under the Comprehensive Environmental Response Compensation and Liability act (CERCLA) or the Resource Conservation and Recovery Act (RCRA).

(4) Bioassay tests (demonstration) should not be included as a potential exemption requirement. The main problem with these tests is that the results are biased towards the test species used. The implementation will be extremely subjective through Agency oversight.

(5) Constituent specific characteristics should be included in the decision processes. This includes constituent concentrations, mobility, and persistence.

d. Determination Procedures.

(1) The proposed regulations state the "contained-in" determination wold not be self-implementing. The contained-in determination will be made by the EPA Regional Administrator or designee on a site specific basis.

(a) The approach to only allow a "contained-in" determination through a petitioning process with the final decision made by the Regional Administrator is appropriate in the short term. A framework is still needed that provides for a self implementing determination for contaminated media from RCRA Subtitle C requirements.

(1) The assumption in the RCRA hazardous waste program that all wastes will be mismanaged may have had validity in the early years of the program prior to widespread compliance and enforcement mechanisms. Today, a more realistic approach is needed which considers how hazardous waste/media is actually managed by the regulated community. If laws and regulations were routinely structured to assume at the outset that those impacted by the requirements wold not comply, as was done with RCRA, the results would be disastrous for the economic well being of this country. The "contained-in" approach is good but other exclusion operations need to be developed based n health risks and how the disposed waste is managed. These exclusions would have to be self implementing. This approach also takes into consideration the importance of targeting limited environmental funding resources on the problems posing the greatest risks.

(2) The EPA should recognize generator self interest in avoiding potential liability are certain to lead them to erect their own safe-guards to ensure all media is properly treated and disposed even with a "contained-in" determination or other RCRA Subtitle C exclusion.

(b) If omnibus authority is given to the EPA Regions for additional analytical requirements and other data requirements beyond the base Federal RCRA requirements, then the effectiveness of implementing this program could be limited. Such limitation, based on Regional judgements, is inconsistent with the concept of a uniform national program, and should be strongly discouraged.

(2) For this proposed rulemaking to be effective, the states will have to adopt regulations for a "contained-in" determination and the treatment standards for contaminated media. These proposed rules could be considered less stringent and reduced in scope from the existing Federal RCRA program which most states have adopted. States wold not be required to adopt these proposed rules. This view effectively eliminates most of the regulatory relief the EPA set out to provide the nation by engaging in this rulemaking. Although some states may choose to adopt a "contained-in" determination and these treatment standards for contaminated media, absent a Federal mandate, the incentives for change from existing overly conservative state regulation are few. The EPA should maintain a position that the adoption of these rules are fundamental to the RCRA Land Disposal Restriction program and require state adoption. If not, there will not be a consistent national model.

e. Waiver of the procedural requirements for a "contained-in" determination for those subject to public notice under RCRA or CERCLA. The Army concurs with the provision for establishing a waiver procedure. The current levels of program oversight by EPA should be sufficient for a "contained-in" determination and therefore meet the notification requirements. To utilize the program under CERCLA, the use of the Public Information and Response Plan should be considered fully adequate for public notification." (Department of the Army, CS2P-0160)

- "**EPA requests comment on decision criteria for evaluating petitions for obtaining "contained-in" determinations for contaminated media.**

As noted in Item VII.B.3. of these comments, DOE supports codification of the "contained-in" policy for hazardous soil and other environmental media. The Department, however, believes that the Agency should include a suitable self-implementing alternative (to the proposed petition review procedure) for making "contained-in" determinations involving hazardous soils. DOE urges EPA to consider a regulatory approach that would require the petition process only when hazardous constituents in the media exceed the UTS levels (in lieu of or until "minimize threat levels" or appropriate risk-based levels are established). With regard to cases where a petition would need to be submitted to the appropriate regulatory agency, DOE believes the Agency should identify specific criteria that must be included in the application for a "contained-in" determination. Each of the criteria identified should be thoroughly explained so that the regulated community is fully knowledgeable of the information requirements related to making such determinations. For example, will the EPA require submittal and approval of sampling and analysis plans and quality assurance/quality control procedures prior to collection of samples in order to ensure that such samples are representative of the area of contamination in question?

DOE recommends that the Agency provide more specific guidance regarding data that must be gathered and submitted in support of decisions regarding “contained-in”status, that the level of quality assurance/quality control associated with these data be specified, that methods used to calculate “acceptable” human health risk factors be specified, that waste characteristics such as persistence and potential to bioaccumulate be included in the criteria, and that the method use by the Agency to reach final decisions regarding the “contained-in” status of hazardous soil be specified. Further, DOE recommends that the Agency should include criteria such as contingent management options for soils that are hazardous only due to the derived-from or mixture rules and that only slightly exceed the risk rang of 10^{-4} to 10^{-6}. For example, a determination that a soil no longer “contains “ hazardous wastes might be made for hazardous soils that exceed the allowed risk range, on a case-by-case basis, provided such soils were managed on-site in a manner that adequately protects human health and the environment. It also seems appropriate for EPA to provide clarification regarding the time periods that would be involved for making “contained-in” determinations and the status of the hazardous soils during the period of time between the submittal of a “contained-in” determination request and the final decision.
In addition to the proposed requirements, it seems reasonable for EPA to request the following information in the petition in order to properly evaluate submittals:

A. identification of the SOURCE of the contamination IF AVAILABLE AND KNOWN (260.42 as proposed requests an explanation of the circumstances by which the media became contaminated, which could be interpreted to mean only a description of an event such as a transportation accident):

B. estimated volumes of soil which will be affected by the “contained-in” determination;

C. intended disposition of soil (e.g., to be managed in a Subtitle D landfill, to remain in place, etc.) [The language in 260.42(c)(3-7) appears to assume that the waste will remain in place;

D. any analytical data which is available (while avoiding requirements for extensive testing, at least for RMW, due to the analytical difficulties detailed above).

EPA solicits comment on whether the final rule should specify a list of criteria that must be considered.

DOE believes that identifying the general criteria (see comments in Section Item

VII.D.1., above) and advising the regulated community on how to structure the application will promote consistency as long as that criteria and structure are not unduly specific or restrictive.

EPA proposes to waive from the procedural requirements of the "contained-in" determination those already subject to public notice under RCRA or CERCLA authority.

DOE supports EPA's proposed approach (under 2604.42(a)) that would waive the need to submit a "contained-in" determination petition (and waive the other associated procedural requirements) for remedial actions conducted pursuant to RCRA or CERCLA authorities provided that a similar determination is made (by the EPA Regional Administrator) based on "substantially equivalent" information, and similar public notice and comment requirements." (DOE, CS2P-00161)

- "We also view the suggestion in the Proposal to tie "contained-in determinations" to the arbitrary proposed treatment standards as adverse to sound environmental and public health policy. By federalizing the contained-in policy through incorporation in a HSWA-driven rulemaking, the Agency threatens to usurp authorities historically vested in individual states who have, almost without exception, elected to accept the role of regulating waste characterization under RCRA.[29]" (USPCI, CS29-00171)

- "Unocal supports EPA in its decision to codify the "contained-in" principle to the extent that there should be a level at which soils no longer "contain" a listed hazardous waste. The deferral of the codification to the HWIR rulemaking is appropriate in that the HWIR came out of EPA's effort to revise the "mixture" and "derived-from" rules and the "contained-in" policy is related to these rules. Unocal supports API's assertion that any future codification of the "contained-in" policy should be risk based. Furthermore, Unocal strongly contends that any risk based approach used in HWIR, including the "contained-in" policy, should only include exposure pathways that are plausible and scientifically credible." (UNOCAL, CS2P-00185)

- "**Page 48155, Part 260-Hazardous Waste management System: General; S 260.42 Procedures for contained in-determinations for hazardous debris, hazardous soil and other environmental media.**

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[29] The Agency should note that the contained in policy is concerned primarily with waste identification, not with subsequent treatment. Despite the Agency's action in setting alternative standards for hazardous debris, whether the EPA has the authority to intrude on state programs to make them less stringent is a matter of some doubt. In our view, the action lacks a sound basis in policy. If the EPA's objective is to facilitate clean-up at CERCLA sites by providing administrative relief from the ARARs, Congress has already provided such a means in CERCLA itself.

a. This section states that a person may petition the Regional Administrator to exclude hazardous debris, hazardous soil and other environmental media from regulation as hazardous waste if the debris, soil or media do not pose a hazard to human health and the environment at the site. The Regional Administrator will base this determination on site specific information.

The Minnesota Department of Agriculture (MDA) requests that states that are authorized with primary enforcement responsibility for the Resource Conservation and Recovery Act (RCRA) be allowed to make contained-in determinations, rather than the Regional Administrator, after the state has enacted equivalent authority and has been granted authorization by the Environmental Protection Agency (EPA) to administer the program. The Minnesota Pollution Control Agency is authorized with primary enforcement responsibility for RCRA in Minnesota.

States authorized to enforce RCRA, rather than the Regional Administrator, should be allowed to make contained-in determination because the state may be able to make the determination in a more timely manner, will make consistent determination s in accordance with state programs and policies, and will be readily available for consultation with the public.

b. This section states that petitions for contained-in determinations would not be necessary for remedial actions conducted pursuant to RCRA or the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) provided that a similar contained-in determination is made by the Regional Administrator based on substantially equivalent information. After the state has enacted equivalent authority and been granted authorization by EPA to administer the program, the State RCRA Director will be able to make the contained-in determinations

Some RCRA authorized states also conduct remedial actions that are not under RCRA or CERCLA authorities. The MDA believes that the exemption for petitioning the Regional Administrator for contained-in determination should be extended to non-RCRA or non-CERCLA cleanups that are being conducted under the oversight of RCRA authorized states. A contained-in determination would be made by the State RCRA Director for these sites based on information substantially equivalent to that which would be submitted to the Regional Administrator.

c. This section also states that the Regional Administrator will publish a newspaper notice of the proposed decision and provide a 30-day public comment period, however, the Regional Administrator is obligated only to consider the comments when making his/her determination. The introduction to the proposed rule does not state why a public notice and comment period are necessary for contained-in determinations.

Presumably since the contained-in decision is partially based on risks to human health and the environment, EPA thought that the public should have a chance to review the petitions and comment on the decision.

Public notice and comment is required in the RCRA and CERCLA programs to purpose the selected response action to the community following an investigation of the site. The MDA sees the value in a public notice, meeting and comment period for RCRA and CERCLA for community acceptance of the proposed response action.

However, the MDA prefers that the contained-in decisions for non-RCRA and non-CERCLA sites be made by the authorized states without public notice and comment. The MDA does not see the value in providing public notice and comment for a contained-in determination, as this determination may be made after the hazardous constituents in the media have been remediated to low levels which do not pose a threat to human health or the environment. The determination may also be made that the hazardous media do not pose a threat to human health and the environment and do not require any treatment, even though the hazardous media contains low levels of listed hazardous constituents. In either situation the media do not pose a threat to human health and the environment, and little is to be gained by further treatment, if the threat has already been removed. We are concerned that the public will not accept environmental media that has any amount of hazardous constituents within it and will request further reduction of hazardous constituent levels which may add tremendous cost with little gain

In addition, this requirement may lengthen the investigation and/or remediation process for the site.

d. The preamble to the proposed rule states on page 48127 that a contained-in determination "may be made prior to treatment or subsequent to treatment" This statement is not found in the proposed rule under S268.47. The MDA requests that this concept be clearly stated in the final rule so that there if there are some hazardous constituents but do not pose a hazard to human health and the environment then a petition for a contained-in determination can be made without any treatment of the hazardous soil." (Minnesota Department of Agriculture, CS2P-00186)

■ "**WE SUPPORT THE CODIFICATION OF THE CONTAINED-IN POLICY AND ENCOURAGE EPA TO ESTABLISH FLEXIBLE CRITERIA VIA GUIDANCE**

EPA should modify the contained-in policy for soils in a manner that provides clear understanding of contained-in to the States, but reserve the establishment of detailed contained-in determination criteria for guidance to preserve the flexibility and workability of contained-in (CI) determinations. We have found the CI process to be an effective, workable and protective means allowing States to reasonably exempt low level hazardous soils from unnecessary restrictions while ensuring protective management of those materials. Codifying the concept would give further comfort to those States who have expressed concern about the status of contained-in. In doing so we would encourage EPA to be consistent with previous EPA policy on the topic which makes it clear that there must be clear evidence and knowledge that constituents present in a material come from a listed waste to apply a listed code. Such an approach clarifies that there is no presumption that contaminated soils contain hazardous waste I n the absence of clear evidence that they do.

However, we strongly discourage EPA from codifying the criteria for making CI determinations. The criteria proposed in the soil LDR rule are reminiscent of the waste delisting criteria. We have not found the delisting process to be a model of streamlined flexibility, and are concerned that a similar system should result in significant delays in arriving at contained-in determinations, and thus in remediation activities, without any offsetting benefits. The States are already capable of making appropriate CI decision.

Accordingly, we snuggest that EPA lay out contained-in criteria in guidance, rather than in regulation, to preserve the needed flexibility in the process.

For CI to bring relief to remediation it must also be a cap to treatment levels. Granting a CI determination and then requiring treatment to a lower “minimized threat” level would undo any potential benefit from CI. Therefore, we urge the Agency to make clear that CI determinations will also serve as minimized threat determinations.

Contained-In Determination Should Incorporate Realistic, Site Specific Considerations

Contained-in level determination should be site specific and risk based, and we support the need for flexibility in making these determinations. In making contained-in decisions, realistic evaluations of potential risks, taking into account current and reasonably foreseeable land use, must underlie the determinations. To employ overly conservative, hypothetical risk scenarios (such as the “all possible exposure: language in the preamble to the proposed rule) is not only inappropriate, but would often result in contained-in levels so low as to be of no value. The purpose of these determinations should be to exempt low hazard remediation wastes from unproductive regulatory requirements in an efficient manner. If the process is either excessively cumbersome or results in unrealistically low exemption levels int will not serve that purpose.

The final disposition of material should be relevant in contained-in determinations as it effects exposure potentials. Contained-in determinations will typically be made in the context of overseen remedial activities at industrial sites, such that the final disposition of materials can be reasonably evaluated in the context of a contained-in determination and ensured through a Remedial Action Plan.

We fully support EPA's proposal that decisions made in the context of Superfund and RCRA Corrective Action Sites don't require separate contained-in determinations.

In any formalization of the contained-in concept we encourage EPA to ensure that determinations be subject to administrative appeal. Such determinations can have significant impact on an owner/operator. Limiting appeals to the judicial arena is unnecessarily restrictive and presents the potential for protracted legal arguments that could more readily be resolved in an administrative process." (DuPont, CS2P-L0003)

- "We support the codification of the core concepts of the contained-in policy and encourage EPA to establish contained-in criteria through guidance." (DuPont, CS2P-L0003)

- "CONTAINED-IN DETERMINATIONS

Decision factors for making a "contained-in" determination are outlined on pages 48127 and 48128 of the September 14, Federal Register. On page 48128, EPA requests comment on the contained-in decision criteria. Specifically, "(1) Should the final rule specify a list of criteria that must be considered; (2) should the criteria listed above [seven decision factors are presented, ed. note] be more specific regarding the conditions which would allow for or preclude contained-in determinations; and (3) are there other factors the Agency should consider when making contained-in determinations, in addition to those listed above?

OHM fells that the decision factors as currently presented need substantial expansion. In response to the first point, we do not feel that these criteria need to be codified in the rule. EPA noted that flexibility was important in making "contained-in" determinations and OHM agrees that flexibility is important in addressing environmental problems that may pose unique, site specific issues. However, clear national guidance must be provided in order to ensure consistent treatment of wastes and the protection of human health and the environment. Guidance documents, by their nature, allow more flexibility than criteria established in rules but these guidance need to be established early in the process to avoid wide disparity among EPA Regions in making contained-in decisions.

In addressing the second point, OHM feels strongly that more specific guidance is required. For example, one of the decision factors listed was "an acceptable risk range of 10 to 10." This statement does not clearly indicate that cancer risks are being considered, does not include decision factors for noncancer endpoints, and provides no guidance as to the desired (target) end of the cancer risk range. As another example, the potential for exposure of sensitive environmental receptors is listed as a factor that must be considered, yet even at well studied Superfund sites, clear objectives for assessing ecological exposure and risks are generally not available. Without clear definitions and objectives, approaches to addressing potential risk to environmental receptors may be widely variable in different EPA regions and could be used to prevent delisting of wastes or at least to give the appearance that such delisting might not be possible. Without defined objectives, site cleanups (and in particular, voluntary cleanups) may be strongly discouraged.

The seven decision factors are all site characteristics that affect the potential for risk. Rather than simply presenting a short, and quite probably incomplete list of characteristics that affect risk OHM recommends that EPA revise its discussion of the decision factors to focus on the risk management criteria that must be achieved. These criteria could be spelled out in the rule, with the scientific factors that need to be considered (risk assessment issues) present in accompanying guidance. For example:

In making a contained-in decision, the following conditions must be satisfied:

All cancer risks must be regulated to within a risk range of 10 to 10, with a cancer risk level of 10 used as a target risk goal.
The site must not pose a risk due to systemic effects.
The site must achieve adequate protection of ecological endpoints.

The specific requirements to achieve these management goals should be spelled out in accompanying guidance documents, such as the Superfund Risk Assessment Guidance for Superfund documents. Particular situations that might be important in making a contained-in decision that are not covered in RAGS could be outlined in a separate guidance memorandum." (OHM Corporation, CS2P-L0007)

Response: All the comments in this section address EPA's proposal to codify the so called, "contained-in" principle. The contained-in principle is the basis for EPA's longstanding policy regarding application of RCRA Subtitle C requirements to mixtures of contaminated media and hazardous wastes. Under the contained-in policy, media contaminated by listed hazardous waste are not wastes themselves but, because the contain hazardous waste, must be managed as hazardous waste unless or until they are determined not to or no longer to contain hazardous waste. See Chemical Waste Management v. EPA, 869 F.2d 1526, 1439-40 (D.C. Cir. 1989), upholding this as a reasonable interpretation of the mixture and derived from rules. Implicit in the contained-in policy is the understanding that when hazardous constituents reach certain concentrations, media may be determined not to contain hazardous waste.

In order to preserve flexibility and because EPA believes legislative action is needed, the Agency has chosen, at this time, not to go forward with the portions of the September 14, 1993 or April 29, 1996 proposals that would have codified the contained-in policy for contaminated soils. The Agency continues to believe that legislation is needed to address application of RCRA subtitle C requirements to hazardous remediation waste, including contaminated media. If legislation occurs, the Agency will likely re-examine its approach to remediation waste, including contaminated soil. If legislation is not forthcoming, the Agency may, in the future, re-examine its position on the relationship of the contained-in policy to site-specific minimize threat determinations based on implementation experience and/or may choose to codify the contained-in policy for contaminated soil in a manner similar to that used to codify the contained-in policy for contaminated debris. If the Agency does, in the future, take action to codify the contained-in policy, it will respond to these comments, as necessary, at that time.

In the meantime, EPA regions and authorized states may continue to implement the contained-in policy on a site-specific basis. Current EPA guidance on implementation of the contained-in policy as well as the relationship of contained-in determinations to LDR treatment obligations are discussed, in detail, in the preamble to today's final rule.

Many of the commenters in this section, to one degree or another, address the relationship between contained-in determinations, minimize threat determination and LDR treatment requirements. Although EPA is not, at this time, taking action to codify the contained-in policy as discussed above, the Agency notes that the relationship between contained-in determinations, minimize threat levels, and LDR treatment requirements in discussed in detail in the preamble to today's final rule.

5.F SOIL TREATMENT DATABASE

5.F.1 National Capacity Variance

■ "A. National Capacity Variances for Hazardous Soils

Although not explicitly addressed in the notice extending the Phase II rulemaking comment period, API presumes that the proposed national capacity variances for hazardous soils contaminated with Phase I and Phase II wastes remain a part of the Phase II proposal. Since these proposed variances are for hazardous soils, API will address the need for them and submit supporting data as appropriate, and if it is available in comments to the Agency on March 15, 1994." (American Petroleum Institute, CS2P-00061)

Response: This issue is moot. Phase II capacity period is long over.

5.F.2 Bench, Pilot, and Full Scale Studies

■ "HWAC has concerns about the levels which EPA proposes to use to categorize bench, pilot and full scale data. Under EPA's approach, if less than one kilogram ("kg") were treated in any prescribed test, the treatment test would be categorized as bench scale. If, however, more than 1 kg but less than 1000 kg were treated, the test would be categorized as pilot-scale, and treatment tests involving more than 1000 kg would be categorized as full-scale tests. 58 Fed. Reg. at 48,130. HWAC believes that the standards should be modified as follows:

Bench Scale	0-10 kg
Pilot Scale	10-10,000 kg
Full Scale	10,000 - above

It is the strong belief of experienced HWAC members that, in order to gather enough performance data on cleanup technologies, the amounts we have suggested should be adopted. Without expanding EPA's proposed scales, insufficient testing can lead to implementation of uncertain technologies ultimately driving up costs associated with technology implementation." (HWAC, CS2P-00020)

Response: The commenter is concerned with the proposed mass thresholds that define each treatability study as bench-, pilot-, or full-scale. The commenter urges EPA to only consider larger mass sample tresholds when setting treatment standards for hazardous soils. The commenter believes larger mass sample studies will reduce the level of uncertainty that it is involved during the extrapolation of performance data from pilot- and bench-scale processes to the design and operation of full-scale processes. EPA concurs with the commenter that it is desirable to have larger sample sizes, generally, when conducting feasibility studies. Also, EPA points out that there are full-scale data for biotreatment processes (five studies), chemical dechlorination (one study), stabilization (three studies), steam stripping (four studies), and thermal desorption (six studies) in the soil data base. (See Appendix D in EPA 1998a.) The bench-and pilot- scale data for these full-scale processes in the soil data base further corroborate the feasibility of achieving the treatment standards. However, EPA has found that regardless of the sample size being examined, the extrapolation of bench-/pilot-scale data to the scaling of full-scale operations is often an empirical and site specific process that require the exercise of good engineering judgement and the conduction of trial and error operations. Other consulted treatability studies (EPA 1998a, EPA 1988d, EPA1994) show that full-scale ex-situ processes;[30] such as those on which the treatment standards being promulgated today are based, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a.) EPA has also found that the treatment performance ranges attained during the treatability studies in the soil data base are congruent with those reported in other consulted literature including literature that describes full-scale operations. (See Chapter 3 in EPA 1998a, cited references in EPA 1998d, and ex-situ treatment studies in 1995 and 1997 Superfund

[30]Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

treatability studies,[31] and other literature cited below.) Based on these findings, EPA is not persuaded by the commenter's recommendation.

In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction. It is therefore reasonable and appropriate to regard bench and pilot scale treatment test data as indicative of what levels of treatment that technology, when operated at full scale, would yield. This is part of EPA's BDAT approach that has historically been used in setting other LDR treatment standards (See EPA 1993c (arsenic treatment standard is based on the pilot scale vitrification of mineral processing wastes) and EPA 1993d (various treatment standards for organics/metals in wastewater forms of hazardous wastes).)

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous**

[31] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remediation Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

Soils/F-98-2P4F-FFFF.)

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460. (**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1993c, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume A: Universal Standards for Nonwastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1993d, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

- "Only four full scale bioremediation projects are cited by EPA. RETEC has completed many more projects than this itself. The number of sites analyzed by EPA is not sufficient to establish reasonable BDAT standards based on bioremediation.

  The scale up from bench and pilot scale equipment is not a trivial issue. RETEC has developed a number of technologies on the bench that appeared to be very attractive. However once these technologies went to the field, we quickly found out that the technology did not work at a larger scale.

  Only 15% of EPA's data base uses full scale data for all technologies. In most cases there is only one demonstration of each technology. This is simply not enough data to make such critical decisions for such a wide range of chemical compounds." (RETEC, CS2P-00026)

Response: The hazardous soil treatment standards promulgated today are based on the pooled performance of various non-combustion treatment technologies on hazardous soils which include the performance of several bench-, pilot-, and full-scale biological treatment processes. (EPA 1993a and EPA 1998a) The soil data base include the performance of five full-scale biotreatment processes. (See Appendix D in EPA 1998a and treatability study scale threshold discussions in EPA 1993a.)

In the process of evaluating the treatment performance that non-combustion technologies can attain when treating hazardous soils, EPA sorted the treated hazardous constituents into clusters of chemical analytical families (i.e. BDAT list) or functional treatability groups (Contaminated Soil and Debris Treatability groups) and then, compared the treatment performance ranges that the tested analytical cluster/treatability functional groups can attain by specific groups of non-combustion technologies. (EPA 1993a; EPA1998a; EPA 1998b; EPA1998c; EPA1998d; and EPA 1993a.) Also, EPA transferred treatment performance data from the tested hazardous constituents to those that lacked direct treatment data from the non-combustion technologies in the soil data base.

With regard to the treatment performance of biological treatment processes, the soil data base shows that this technology is among the most soil and constituent specific treatment technologies available for the treatment of hazardous soils. The technology will perform best in many compounds that are water soluble, amenable to volatilization, and amenable to co-metabolization. (EPA 1993a, EPA 1998a, EPA 1998c, EPA 1994, and cited academic literature in EPA 1998d.) For instance, many soluble and slightly soluble compounds can be treated to the regime of concentrations established today. The soil data base also shows that Pentachlorophenols, less soluble Polyaromatic hydrocarbons such as PNA's with four or more rings, aromatic chlorinated pesticides, and aromatic chlorinated pesticides are resistant or recalcitrant to biodegradation processes. PCPs and four to five ring PNAs biodegrade at much slower rates or attain an average treatment performance reduction range from 35 % to 70% which falls short from the 90% treatment regime established today. These recalcitrant constituents may require additional treatment by another technology train such as chemical dechlorination (e.g., for non-volatile chlorinated organic pesticides/solvents and oily chlorinated organics such as PCB's and PCPs) or solvent extraction (high molecular weight PNA's and chlorinated organics).

EPA's findings with regard to the performance of bioremediation treatment processes (EPA 1993a, EPA 1998a, EPA 1998b, and EPA 1998d) are quite consistent with other bench-, pilot-, and full-scale operation of bioremediation processes (EPA1998a, EPA1998d, HWTC 1993, and EPA 1994). EPA has determined, therefore, that the available biotreatment performance data support the establishment of treatment standards for many soluble polar organics,volatile aliphatic chlorinated/non-halogenated organics, non-halogenated aromatic, polar organics such as ketones, alcohols, and low molecular weight PNA's (two- to four-rings, generally).

Although EPA prefers, generally, to rely on full scale studies for the purpose of developing and promulgating treatment standards, and this is true with respect to the soil treatment standards as well. However, in this case as well as in many prior LDR treatment standard efforts, EPA's data base includes more than just full scale data upon which EPA can properly rely. Bench and pilot scale technologies can be appropriately considered by EPA (and EPA has historically done so) in setting treatment limits as long as full scale operations of the treatment system under consideration exist or have been demonstrated on wastes/soils.

Furthermore, in this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction. It is therefore reasonable and appropriate to regard bench and pilot scale treatment test data as indicative of what levels of treatment that technology, when operated at full scale, would yield. This is part of EPA's BDAT approach that has historically been used in setting other LDR treatment standards (See EPA 1993c (arsenic treatment standard is based on the pilot scale vitrification of mineral processing wastes) and EPA 1993d (various treatment standards for organics/metals in wastewater forms of hazardous wastes).)

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1993c, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume A: Universal Standards for Nonwastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1993d, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- "**Soil Treatment Database (page 48128):** GM recommends the alternative of using the intent of the test to define the scale of the test. As discussed in the preamble, bench-scale tests are designed to determine whether alternative technologies can achieve established performance criteria; pilot-scale studies are designed to provide detailed cost, design, and performance data; and full-scale operations are designed to achieve remediation of the site." (General Motors, CS2P-00095)

Response: In finalizing the proposed treatment standards for hazardous soils, EPA has decided to retain the proposed mass-based thresholds that define what scale designation shall be given to each treatability study. EPA notes that no matter what is the purpose or scale of a treatability study, a well-designed and well-operated treatment process can yield valuable information regarding the capabilities of a given treatment processes.

As a result, the hazardous soil treatment standards promulgated today are based on the pooled performance of various non-combustion treatment technologies on hazardous soils. (EPA 1993a and EPA 1998a)

References:

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

- "The proposed treatment methodologies for soils containing hazardous wastes are based on results obtained from a limited number of laboratory bench scale tests. Developing a national program for treating soils containing hazardous wastes is unwise with such a limited number of data sets from bench scale experiments. EPA should conduct a detailed interim testing program to determine if the bench scale methodologies can achieve the same results in a full scale project before placing the proposed rule into effect. Once a treatment methodology has proven to be effective in a full scale operation then the treatment methodology should be incorporated into these proposed rules. If it is determined that a treatment methodology is not effective for soils then the methodology should be removed from consideration. In other words, EPA's use of data on innovative technologies may not be appropriate for determining the appropriate treatment standards for soil." (Boeing, CS2P-00029)

Response: EPA disagrees with the commenter that non-combustion (i.e., "innovative") technologies considered by EPA cannot support the establishment of treatment standards. Nor is EPA persuaded by the porposed approach that an interim teasing program shall be established until more full-scale operations are in place. (EPA1998a, EPA 1998d, EPA 1995, and EPA 1994.) Corroborative data also demonstrate that full-scale operation of soil washing and vitrification processes can meet the treatment standards for hazardous soils. (EPA 1995a (soil washing), EPA 1995b (soil washing), and EPA 1997b (vitrification).

References:

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998d, memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1997b, July 1997, Remediation Case Studies: Bioremediation and Vitrification, Volume 5, Federal Remediation Technologies Round Table, EPA, (EPA 542-R-97008 or **NTIS: PB97-177554**)

EPA 1995a, July 1995, Contaminants and Remedial Options at Selected Metal-Contaminated Sites, Office of Research and Development, Washington, D. C. (EPA/540/R-95/512 or **NTIS**: **PB95-271961**)

EPA 1995 b, March 1995, Remediation Case Studies: Thermal Desorption, Soil Washing, and In Situ Vitrification, Federal Remediation Technologies Round Table, EPA, (EPA 542-R-95-005 or **NTIS: PB95-182945**)

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

- "Proposed Approaches for Establishing Treatment Standards for Hazardous Soils (58 FR 48125)

  The three approaches for treatment of hazardous soils are based on data predominantly from bench and pilot tests. Over 50 percent of the data are from bench tests. 58 FR 48126. AWPI is aware of instances where bench tests using a certain technology were successful in meeting the Alternative 2 standards yet actual field application did not meet the UTSs. The Institute hopes that EPA understands all of the potential ramifications of basing suggested treatment approaches on predominantly bench and pilot test results. The fact is that bench and pilot tests will often not reflect reality in field applications due to a number of variables encountered in the field.

  If the Agency truly wishes to foster alternative innovative technologies, AWPA recommends that EPA raise the incineration-based UTS levels, which were based on bench tests and pilot tests, to level achievable by other methods such as biological treatment. Should EPA decide not to raise these UTS levels, then the Agency should make provision in the final rule that treatment approaches selected from bench and pilot tests are deemed adequate when applied in the field. Otherwise, the regulated community will be subjected to costly treatment trains which can only stifle alternative innovative technology development." (American Wood Preservers Institute, CS2P-00047) [Also see Chapter 27.A.]

Response: The hazardous soil treatment standards promulgated today are based on the pooled performance of various non-combustion treatment technologies on hazardous soils which include the performance of several bench-, pilot-, and full-scale biological treatment processes. (EPA 1993a and EPA 1998a) In the process of evaluating the treatment performance that non-combustion technologies can attain when treating hazardous soils, EPA sorted the treated hazardous constituents into clusters of chemical analytical families (i.e. BDAT list) or functional treatability groups (Contaminated Soil and Debris Treatability groups) and then, compared the treatment performance ranges that the tested analytical cluster/treatability functional groups can attain by specific groups of non-combustion technologies. (EPA 1993a, EPA1998a, EPA 1998b, EPA1998c, and EPA1998d.) Also, EPA transfered treatment performance data from the tested hazardous constituents to those that lacked direct treatment data from the non-combustion technologies in the soil data base.

With regard to the treatment performance of biological treatment processes, the soil data base shows that this technology is among the most soil and constituent specific treatment technologies available for the treatment of hazardous soils. The technology will perform best in many compounds that are water soluble, amenable to volatilization, and amenable to cometabolization. (EPA 1993a, EPA 1998a, EPA 1998c, EPA 1994, and cited academic literature in EPA 1998d.) For instance, many soluble and slightly soluble compounds can be treated to the regime of concentrations established today. The soil data base also shows that Pentachlorophenols, less soluble polyaromatic hydrocarbons such as PNA's with four or more rings, aromatic chlorinated pesticides, and aromatic chlorinated pesticides are resistant or recalcitrant to biodegradation processes. PCPs and four to five ring PNAs biodegrade at much slower rates or attain an average treatment performance reduction range from 35 % to 70% which falls short from the 90% treatment regime established today. These recalcitrant constituents may require additional treatment by another technology train such as chemical dechlorination (e.g., for non-volatile chlorinated organic pesticides/solvents and oily chlorinated organics such as PCB's and PCPs) or solvent extraction (high molecular weight PNA's and chlorinated organics).

EPA's findings with regard to the performance of bioremediation treatment processes (EPA 1993a, EPA 1998a, EPA 1998b, and EPA 1998d) are quite consistent with other bench-, pilot-, and full-scale operation of bioremediation processes (EPA1998a, EPA 1998d, HWTC 1993, and EPA 1994). In fact, the technical background documents indicate that hazardous soils contaminated with high concentrations of wood preserving hazardous constituents, such as PCB and PNAs, were successfully treated by these technologies (and by thermal desorption) to achieve the treatment standards in the final rule using non-combustion technologies. EPA has determined, therefore, that the available biotreatment performance data support the establishment of treatment standards for many soluble polar organics,volatile aliphatic chlorinated/non-halogenated organics, non-halogenated aromatic, polar organics such as ketones, alcohols, and low molecular weight PNA's (two- to four-rings, generally).

Although EPA prefers, generally, to rely on full scale studies for the purpose of developing and promulgating treatment standards, and this is true with respect to the soil treatment standards as well. However, in this case as well as in many prior LDR treatment standard efforts, EPA's data base includes more than just full scale data upon which EPA can properly rely. Bench and pilot scale technologies can be appropriately considered by EPA (and EPA has historically done so) in setting treatment limits as long as full scale operations of the treatment system under consideration exist or have been demonstrated on wastes/soils.

Furthermore, in this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction. This is part of EPA's BDAT approach that has historically been used in setting other LDR treatment standards (See EPA 1993c (arsenic treatment standard is based on the pilot scale vitrification of mineral processing wastes) and EPA 1993d (various treatment standards for organics/metals in wastewater forms of hazardous wastes).)

Presumably, the commenter also asked EPA to finalize some provisions in the 40 CFR 268.44 (h) that would allow the use of treatment performance from bench- and pilot-scale studies as documents that can satisfy the requirements for a treatability variance from the treatment standards established in the 40 CFR 268.49. EPA believes that such regulatory provisions are not necessary. This is because existing authorities under RCRA Corrective Action and CERCLA Clean up programs allow for such course of actions. In fact, RCRA and CERCLA feasability studies have been used to pre-approve treatment variances for hazardous debris. However, the acceptance or rejection of such treatability studies is normally the prerogative of the regulatory agency official overseeing the implementation of LDRs (or ARARs) that apply to the treatment and disposal of hazardous soils. This is an expected result since Regional/authorized State officials are more familiar with the complexities of the remediation site and they can exercise a better judgement on the quality of bench- and pilot-scale treatability studies.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460. (**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1993c, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume A: Universal Standards for Nonwastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1993d, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- "II. Treatability Data

  The data provided on this issue by the Project membership confirm that performance obtained in bench scale testing is seldom achieved in full scale field operations. For example, one member reports that the shortfall is frequently such that actual reductions are in the 60%-70% range, notwithstanding much more optimistic projections from the laboratory scale work. Another member reports significant variation even in bench scale results, with removals varying from as little as 7% to as much as essentially 100%. One member reports bench scale results for a bioremediation process that show chlorinated PAH reductions from 9% to 90+% over an initial concentration range of approximately 3, 000 mg/kg to 7, 000 mg/kg. Conversely, a bench scale soil solvent washing process yielded better than 99% removal of aromatic VOCs over an initial concentration range from approximately 50 to 2, 000 mg/kg.

It is clear from the information provided by the RCAP member companies that most of the data reported in the literature regarding performance of treatment technologies is vendor-generated bench-scale data which is not likely to be representative of actual field applications for several reasons: 1) vendor data often represents the best results for individual constituents from numerous tests, rather than from contemporaneous performance on all constituents in the matrix; 2) bench scale tests often employ equipment very unlike that which would be used in full scale applications; and 3) there is an inevitable degradation in performance when moving from carefully controlled lab tests on small matrix samples to less controllable full scale field applications addressing the heterogenous materials typically managed in remediation project." (RCRA Corrective Action Project, CS2P-00164.C)

Response: EPA concurs with the commenter that it is desirable to have larger sample sizes, generally, when conducting feasibility studies. Also, EPA points out that there are full-scale data for biotreatment processes (five studies), chemical dechlorination (one study),stabilization (three studies), steam stripping (four studies), and thermal desorption (six studies) in the soil data base. (See Appendix D in EPA 1998a.) The bench- and pilot-scale data for these full-scale processes in the soil data base further corroborate the achievability of treatment standards. However, EPA has found that regardless of the sample size being examined, the extrapolation of bench- /pilot-scale data to the scaling of full-scale operations is often an empirical and site specific process that require the exercise of good engineering judgement and the conduction of trial and error operations. Other consulted treatability studies (EPA 1998a, EPA 1988d, EPA 1994) show that full-scale ex-situ processes;[32] such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a.) EPA has also found that the treatment performance ranges attained by the treatability studies in the soil data base meet are congruent with those reported in other consulted literature including literature that describe full-scale operations. (See Chapter 3 in EPA1998a, cited

[32]Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

references in EPA 1998d, and ex-situ treatment studies in 1995 and 1997 Superfund treatability studies,[33] and other literature cited below.) Further, the soil data base describe the treatment of difficult-to-treat soil textures and difficult-to treat admixtures of hazardous constituents/multiple-contaminants (see Appendix D in EPA 1998a and EPA 1998d). In all cases, at least some of the data shows that the soil standards have been achieved on difficult-to-treat matrices or soils contaminated with hard-to-treat constituents using full scale treatment. Based on these findings, EPA is proceeding with the proposed treatment standards for hazardous soils.

In evaluating what paired data points were suitable as a basis for the Phase IV hazardous soil treatment standards, EPA did examine for possible bias in the consulted studies and rejected data points that resulted from operational practices that result from atypically designed and operated full-scale operations. For example, the Data Summary Form (DSF) Number 76 A, biotreatment, was rejected because the treatment batch test involved a bed that was tilled daily and continuously aerated. Clearly, DSF Number 76 A is an atypical practice of full-scale biotreatment process operation. A full scale operation may involve, instead, the aeration of soils twice a week. See Chapter 5 of the BDAT Background Document for Hazardous Soil, August 1993, for a discussion of the criteria EPA adopted for the review and evaluation of the available data in this docket. Also, see EPA's findings on these data review and evaluation can be found in administrative record. For example, see EPA 1993 a.

Other consulted treatability studies/literature (EPA 1998a, EPA 1988d, EPA 1994) show that ex-situ processes[34]; such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a) Based on these findings, EPA is not persuaded by the commenter's recommendation that the proposed mass based thresholds be adopted.

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[33] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

[34] Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460. (**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

- “**The Agency discusses how scale (i.e., bench-, pilot-, or full-scale) was entered into EPA’s database, and indicates that when scale was not indicated (with the data and accompanying documents), it was then entered depending on the amount of waste being treated. Of less than 1000 kg was treated, the test was categorized as bench-scale. If more than 1 kg, but less than 1000 kg was treated, the test was categorized as pilot-scale. Cases where treatment involved more than 1000 kg were categorized as full-scale. Alternative methods for defining the scale of the treatment test will also be considered. EPA requests comment on an alternate definition of scale based on the “intent of the test.”**

  DOE considers the “intent-based” criterion to be more suitable and appropriate than quantity-based criterion for defining the scale of treatment tests. The intent-based method would better accommodate the fact that bench-scale tests are part of the RI/FS process and are intended to evaluate various technologies. The objectives of pilot-scale tests are to provide reliable information about design, scale-up and costs. Even though full-scale (field-scale) application of selected remedial technologies are not considered to be studies, the data derived from these operations provide useful information about site-based costs. For example, soil washing treatability tests are being conducted on Hanford site trench soils contaminated with reactor cooling water containing various radionuclides. The intention of these tests is to generate data normally generated through bench-scale tests. However, some of the soils in the trench are very coarse in texture, and contain gravel and cobble size material. Therefore, for certain tests, researchers had to use more than 1 kg quantities to obtain representative samples. According to the EPA quantity-based criterion, these tests would inappropriately be considered pilot-scale. An intent-based approach would readily and correctly recognize them as bench-scale.” (DOE, CS2P-00161)

Response: EPA acknowledges that a quantity or intent based approach to define the scale of a treatability study is often a subjective judgement. For the purpose of this rule, EPA is retaining, however, the proposed mass quantification approach that designates soil treatability studies as bench-, pilot-, and full-scale.

- **GREEN TAB** (RETEC, CS2P-00026.B)

- **GREEN TAB** (NY State Dept. of Environment, CS2P-00133.C)

5.F.3 General Concerns About the Data Base

- “RETEC has serious concerns over the data base employed by EPA to formulate the proposed Universal Standards and the order of magnitude “ceiling” for hazardous soils. Key conclusions of our analysis are as follows:

  a. Treatment levels are based on very little full scale data.

  b. It does not appear that bioremediation was considered an appropriate technology for any herbicides and pesticides. The standards established can only be achieved by incineration.

  c. RETEC’s full and pilot scale bioremediation data base indicates that the universal standards and resulting ceilings are established far too low. In essence the proposal will limit the use of bioremediation to treat hazardous soils." (RETEC, CS2P-00026)

Response: RETEC is concerned that the treatment standards established today may not be achievable by bioremediation technologies and urged EPA to set treatment standards that can be achieved by biotreatment processes.

RETEC feels one or more of the following items are flaws in EPA soil treatment data:

(1) Treatment levels are based on very little full scale data.

(2) It does not appear that bioremediation was considered an appropriate technology for any herbicides and pesticides. The standards established can only be achieved by incineration.

(3) RETEC's full and pilot scale bioremediation data base indicates that the universal standards and resulting ceilings are established far too low. In essence the proposal will limit the use of bioremediation to treat hazardous soils." (RETEC, CS2P-00026)

Below are EPA responses to these concerns:

(1) What is the basis of the hazardous soil treatment standards?

The hazardous soil treatment standards promulgated today are based on the pooled performance of various non-combustion treatment technologies on hazardous soils which include the performance of several bench-, pilot-, and full-scale biological treatment processes. (EPA 1993a and EPA 1998a) In the process of evaluating the treatment performance that non-combustion technologies can attain when treating hazardous soils, EPA sorted the treated hazardous constituents into clusters of chemical analytical families (i.e. BDAT list) or functional treatability groups (Contaminated Soil and Debris Treatability groups) and then, compared the treatment performance ranges that the tested analytical cluster/treatability functional groups can attain by specific groups of non-combustion technologies. (EPA 1993a, EPA1998a, EPA 1998b, EPA1998c, and EPA1998d.) Also, EPA transfered treatment performance data from the tested hazardous constituents to those that lacked direct treatment data from the non-combustion technologies in the soil data base where structure-activity relationships among hazardous constituents justified the transfer. .

None of the available data in the soil data base support a determination that biotreatment is an effective technology in treating chlorinated herbicides and pesticides. The soil data base show, however, that thermal desorption and chemical dehalogenation are effective in treating soils contaminated with chlorinated pesticides and herbicides. (See Appendix D of EPA 1998a.) Based on the treatment of PCBs by chemical/solvent extraction, EPA also believes that chlorinated pesticides and herbicides can be treated by chemical/solvent extraction. The commenter's apparent premise that to be valid, a standard must be achievable by bioremediation is simply not correct. There is no reason to base standards for certain constituents on performance of a treatment technology known to be inferior for treating those constituents. Quite simply, other appropriate (i.e., non-combustion) technologies exist which treat these constituents much more effectively.

(2) Was bioremediation considered an appropriate technology for herbicides and pesticides? Can the established treatment standards (presumably for herbicides) only be achieved by incineration?

EPA has limited data on the treatment of chlorinated pesticides via biotreatment. Two data sets on the biotreatment of chlorinated pesticides via biological are available. (See EPA 1998a, Appendix D, pages Biological Treatment number 2 and 6.)

One data set describes the bench scale treatment of p,p' DDT (three paired data points with maximum untreated concentration of 1,400 mg/kg) and toxaphene (three paired data points with a maximum concentration of 180 mg/kg) via aerobic composting. The treatment performance reduction of p,p' DDT varied from 14% to 21% and toxaphene varied from 39% to 87%. None of these six data points meet the treatment standards. It appears that these two hazardous constituents are resistant to the biotreatment processes applied in this study. It is likely that the concentrations of p,p'DDT inhibit the treatment performance of this treatment system. Pretreatment of p,p' DDT via some other co-metabolite should be investigated to assess the feasibility of reducing the high concentrations of p,p'DDT prior to treating toxaphene via composting. Alternatively, the soil contaminated with these two constituents may be treated by dechlorination or high temperature thermal desorption.

The second data set describes the bench-scale treatment of toxaphene via a bioslurry system. The untreated concentration of toxaphene varied from 265 mg/kg to 819 mg/kg. The bioslurry attained a treatment reduction range that varied as shown below:

Untreated Concentration (mg/kg)	Treated Concentrattion (mg/kg)	% Reduction
264	6	97.7
359	19	94
819	267	67

It appears that the consortia of microorganisms of this bench-scale study were sensitive to a threshold concentration of toxaphene. As the data show, at concentrations of 359 and 264 mg/kg, treatment efficiencies are within the 90% reduction range established today. In contrast, at a concentration of 819 mg/kg the bioslurry efficiency drops significantly to from 90% regime to a low reduction level of 67%. These soils may require microorganisms that have been acclimated to these high level concentrations or the use of an alternative treatment technology such as a dechlorination or high temperature thermal desorption process.

Based on the available bioremediation data, it appears that bioremediation process may attain an inferior performance efficiency compared to other non-combustion technologies demonstrated on hazardous constituents as difficult to treat as chlorinated pesticides. (See EPA 1998a, EPA 1998c, and EPA 1998d.)

The treatment standards for chlorinated herbicides and pesticides are based on the chemical dehalogenation of PCBs, chlorinated organics, chlorinated pesticides (e.g. DDT, DDD, & DDE) and herbicides (e.g. 2,4,5-trichlorophenoxy acetic acid) and the thermal desorption of chlorinated herbicied/pesticides. Based on the solvent extraction of PCBs, EPA believes that solvent extraction can be used to treat chlorinated pesticides and herbicides.

(3) Are the hazardous soil treatment standards too low for bioremediation treatment processes?

With regard to the treatment performance of biological treatment processes, the soil data base shows that this technology is among the most soil and constituent specific treatment technologies available for the treatment of hazardous soils. The technology will perform best in many compounds that are water soluble, amenable to volatization, and amenable to co-metabolization. (EPA 1993a, EPA 1998a, EPA 1998c, and cited academic literature in EPA 1998d.) For instance, many soluble and slightly soluble compounds can be treated to the regime of concentrations established today. The soil data base also shows that Pentachlorophenols and less soluble Polyaromatic hydrocarbons such as PNA's with four or more rings are resistant or recalcitrant to biodegradation porcesses. The data discussed above also show that treshold concentrations of chlorinated pesticides may inhibit the bioremediation of chlorinated pesticides. PCPs and four to five ring PNAs biodegrade at much slower rates or attain an average treatment performance reduction range from 35 % to 70% which falls short from the 90% treatment regime established today. These recalcitrant constitunets may require additional treatment by another technology train such as chemical dechlorina-tion (PCP and chlorinated organics), solvent extraction (PNAs, PCP, and chlorinated pesticides), and thermal desorption (PNAs, PCP, and chlorinated pesticides). EPA's findings with regard to the performance of bioremediation treatment processes (EPA 1993, EPA 1998a, and EPA 1998b) are quite congruent with other bench-, pilot-, and full-scale operation of bioremediation processes (EPA1998a, EPA 1998d, HWTC 1993, and EPA 1994).

EPA has determined, therefore, that the biotreatment performance data in the soil database is viable for rulemaking for a limited set of hazardous contaminants. The treatment performance of bioremediation processes becomes inferior for insoluble compounds and heavily chlorinated organics. As a result, the technology may be inappropriate for some of these recalcitrant constituents.

Although EPA prefers, generally, to rely on full scale studies for the purpose of developing and promulgating treatment standards, and this is true with respect to the soil treatment standards as well. However, in this case as well as in many prior LDR treatment standard efforts, EPA's data base includes more than just full scale data upon which EPA can properly rely. Bench and pilot scale technologies can be appropriately considered by EPA (and EPA has historically done so) in setting treatment limits as long as full scale operations of the treatment system under consideration exist or have been demonstrated on wastes/soils.

Furthermore, in this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460. (**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

- “**The soil database includes data for 94 of the 191 constituents subject to the proposed soil treatment standards. The Agency transferred the UTS to constituents for which the database does not contain data and justified this action on the grounds that the data supported the use of the UTS for all organic constituents for which innovative technology data were available.**

  “It is not apparent from the information provided in the preamble as to whether the transfer of the UTS to constituents for which the soil data base contains no data is fully warranted. The Agency should provide a more detailed discussion and justification for this action than provided in the proposed rule.” (DOE, CS2P-00161)

Response: EPA has clarified in today’s final rule how EPA is extrapolating the available treatment data to other hazardous soils and hazardous constituents that lack treatment data in the soil treatment data base. (See Section VII. B. 8 in the preamble) The commenter is referred to the following four background documents:

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:“Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds,” April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:“Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble,” April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, memorandum titled: “Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation,” April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

- “d. “Risk-based” arbitrariness.

  EPA states that its goal is to establish risk-based standards that can satisfy “minimize threat” levels, and “so cap the extent of hazardous waste treatment.” This is a reincarnation of the policy expressed in last year’s discredited and withdrawn HWIR proposal.

EPA has demonstrated that it knows how to use risk assessment to justify any answer it wants.[35] This is shown in the recent no-migration petition granted to the Exxon Land Farm facility in Billings Montana to dispose of hazardous waste (58 Fed. Reg. 40134). In approving this petition, EPA allows the land disposal of untreated petroleum refining waste, containing percent level concentrations, with resulting levels of benzene emissions predicted to be as high as 50% of the health based limit at the property line. This modeling leaves little margin for error. Yet if the waste were treated using incineration, the level of benzene an individual at the property line would be exposed to is 1.9 million times lower than the health based level! While EPA forces a combustion technology to limit air emissions based upon both direct and indirect exposure, in the Exxon land farm no-migration petition, only lax inhalation risk assessment standards were used to justify an answer the EPA wanted.

EPA also uses a similar arbitrary rationale to justify the answer it is looking for in the Sept. 14, 1993 proposed LDR rule. The "innovative" technologies are evaluated in the "BDAT Background Document for Hazardous Soil" dated August 1993 (RCRA Docket # CS2P-S0599). EPA has widely misused data in this document. Of particular importance, in Table 5.2 of this document, EPA attempts to justify treatment standards for hazardous contaminated soils at levels above the UTS. In this table, EPA presents the percentage of data points from various technologies that comply with three proposed options for establishing treatment standards for hazardous organic constituents. Data from over 200 treatment operations are included. EPA attempts to hide the performance of thermal destruction by grouping it under the category "all" in the table reproduced below, but the HWTC has reconstructed this table from the raw data provided in the docket. The third column and the last line in the table below were not provided by EPA.

SUMMARY OF THE PERCENTAGES OF DATA PAIRS FOR ORGANIC CONSTITUENTS IN THE SOIL DATABASE THAT MEET THE PROPOSED BDAT FOR HAZARDOUS SOIL

SOIL BDAT STANDARD	ALL TECHNOLOGIES	INNOVATIVE TECHNOLOGIES	THERMAL DESTRUCTION
	70%		
UTS	74%	65%	91%
10 x UTS + 90%	93%	69%	95%
Treatment	81%		
10 X UTS		91%	100%
90% Treatment		77%	98%
% OF DATA BASED ON BENCH SCALE TESTS		60%	< 5%

It is clear from the above that thermal destruction technologies perform far superior to the "innovative" technologies evaluated by EPA with regard to residual concentrations of hazardous

[35] We reference our comments on the Agency's withdrawn HWIR proposal from 1992. 57 Federal Register 21450 (May 20, 1992). These comments discuss, among other things, the numerous instances where EPA proposed risk-based approaches that were later withdrawn due to the excessively high exposures that would have been allowed.

constituents. Yet EPA is attempting to raise BDAT treatment standards to levels that would allow more technologies to pass. In fact, Table 5-3 in the Soil BDAT Background Document demonstrates that Thermal Destruction Technologies consistently have a treatment efficiency for organic constituents in the range of 95% to 100%. In contrast, the pooled data for innovative technologies have a very inconsistent and poor performance for treatment efficiency for hazardous constituents in the range of 17% to 99.9%.

Response: The commenter is correct that incineration is a more aggressive soil treatment technology than non-combustion technologies. This does not mean it is appropriate to base treatment standards for soils on incineration. The Agency reiterates that, in the remediation context, in assessing whether threats posed by land disposal have been minimized, one should appropriately consider the risks posed by leaving previously land disposed waste in place as well as the risks posed by land disposal of waste after it is removed and treated. 62 FR 64506 (December 5, 1997). For example, if a treatment standard for organic constituents based on performance of incineration typically results in already land disposed materials such as contaminated soils being capped in place rather than more aggressively remediated, threats posed by land disposal of the waste ordinarily would not be minimized. Conversely, a treatment standard that results in substantial treatment (followed by secure land disposal) can be said to minimize threats, taking into account the totality of threats posed (i.e. including those posed if the soil were left in place untreated). Id. The soil treatment standards will ordinarily ensure that contaminated soil is appropriately treated to satisfy the requirements of RCRA Section 3004(m), considering both the threats posed by new land disposal of treated soil and the threats posed by on-going land disposal of existing contaminated soil (e.g., if the soil were left in place untreated).

For soil contaminated with organic constituents, EPA has noted many times that, notwithstanding the fact that such soils can be burned, it is generally unsuitable or impractical from a technical standpoint to burn large volumes of mildly contaminated soil. See, For example, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806-18808 (April 29, 1996). In addition, the Agency has documented potential difficulties that may arise from the combustion of soil due to soil/contaminant characteristics that affect incineration performance such as the concentrations of volatile metals, the presence of alkali salts, fine particles of soils such as clays and silts, and the ash fusion point of the contaminating waste. For example, operation of an incinerator at or near the waste ash fusion temperature can cause melting and agglomeration of inorganic salts; the loading of clays and silts in some soils may also result in high loadings of particulate matter in flue gases. See *Proposed BDAT Background Document for Hazardous Soils*, August 1993 and *Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988.

Thus, EPA agrees with the commenter that combustion, generally, appears to achieve a superior performance than other non-combustion technologies in the data base, EPA disagree with the commenter that the proposed treatment standards should be withdrawn. In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

■ e. Lowest common denominator.

EPA is taking a "lowest common denominator" approach to BDAT treatment standards. When it comes to hazardous waste treatment, EPA has declared that a "D" grade is good enough, and is proposing to "curve the test" to allow even marginal treatment to pass. This is to the detriment of the environment, and only serves the needs of political expediency in reaching the arbitrary goals of the combustion strategy–phasing out thermal destruction. This is despite the fact that the data demonstrates that thermal destruction technologies provide the greatest degree of treatment and are the most environmentally protective. These points are valid for both process wastes and remedial wastes.

Response: The Agency reiterates that, in the remediation context, in assessing whether threats posed by land disposal have been minimized, one should appropriately consider the risks posed by leaving previously land disposed waste in place as well as the risks posed by land disposal of waste after it is removed and treated. 62 FR 64506 (December 5, 1997). For example, if a treatment standard for organic constituents based on performance of incineration typically results in already land disposed materials such as contaminated soils being capped in place rather than more aggressively remediated, threats posed by land disposal of the waste ordinarily would not be minimized. Conversely, a treatment standard that results in substantial treatment followed by secure land disposal can be said to minimize threats, taking into account the totality of threats posed (i.e. including those posed if the soil were left in place untreated). Id. The soil treatment standards will ordinarily ensure that contaminated soil is appropriately treated to satisfy RCRA Section 3004(m), considering both the threats posed by new land disposal of treated soil and the threats posed by on-going land disposal of existing contaminated soil (e.g., if the soil were left in place untreated).

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Nor is EPA adopting a least common denominator approach. Although EPA agrees with the commenter that combustion, generally, appears to achieve a superior performance than other non-combustion technologies in the data base, EPA disagree with the commenter that the proposed treatment standards should be withdrawn. In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

f. Contrary to established BDAT protocols.

This also violates EPA's scientifically established protocols for setting BDAT standards. Throughout the first, second and third third LDR rules, EPA pooled together treatment data from different technologies only if they represented part of the same statistical universe, as demonstrated using an analysis of variance (ANOVA) test to ensure that the analysis was not biased. Now EPA is abandoning good statistics and science in favor of imposed bias, to raise treatment standards to an arbitrary level that allows even marginal treatment to pass.

EPA also has a long established policy of only using full scale treatment plant data to make certain that the technologies on which BDAT is based are available. In contrast, 90% of the "innovative" technology data evaluated in the soil BDAT document are based on pilot or bench scale treatments, with less than 10% based on full scale demonstrations. The percentage of time that these technologies in full scale operation will meet even the BDAT options tabulated above will be far less, since full-scale performance is generally poorer than bench or pilot scale.

Response: EPA disagrees with the commenter that the treatment standards are not attainable using non-combustive technologies.

First, the treatment data supporting the proposed rule clearly show and support EPA's determination that several non-combustion technologies can meet the proposed limits for organic and metal constituents found in hazardous soils, or 10 x UTS levels, or the 90% reduction in the total or leachable concentration of hazardous constituents present in hazardous soils. (See preamble in Phase IV final rule; EPA 1998a; EPA 1998 b; EPA 1998c; and EPA 1998d). For instance, EPA collected over 6,000 paired data points describing the treatment of various hazardous soils. In response to an outgrowth of the comments, EPA has retained 2,143 paired non-combustion data points to set today's treatment standards. EPA believes that these 2,143 paired non-combustion data points are reasonably sufficient to adequately describe the treatment of metal, organics, and multiple metal and organic contaminants that are frequently found at different type of sites, including both Superfund and RCRA sites. (EPA1998a, EPA 1998b, EPA 1998c, EPA 1998d, and EPA 1994.) For instance, the SDB has treatment data on soils with varying textures including top soils, silty/loam soils, and clay soils. (EPA 1998a) Furthermore, EPA has a number of bench and pilot studies on the treatment of contaminated soils from wood preserving, petroleum refining, and electroplating sites, which contain a wide range of constituents such as polynuclear aromatic, phenolic,chlorinated organics, spent solvents, creosote, and metals. (EPA 1998a) These constituents are found at other RCRA and

Superfund sites. (EPA 1993a)

Second, full-scale data on non-combustion technologies, published in 1995 and 1997, show that ex-situ chemical and energy intensive remediation technologies applied to Superfund sites can be engineered and optimized, generally, to meet pre-designed remediation treatment objectives. In many instances, ex-situ processes were able to meet a 90 % reduction of hazardous constituents in soils or the 10 times UTS limit. (EPA 1998a) EPA refers to these data as the Superfund full scale 1995 and 1997 data studies.[36]

Third, other pilot- and full-scale data supporting the development of Superfund Presumptive Remedy guidance documents for wood preserving sites also support EPA's proposed treatment standards. In particular, thermal desorption was able to attain concentrations and concentration reduction levels meeting the treatment limits established by this rule. (EPA 1993b, EPA 1995a, and EPA 1997a.)

This is an expected result since ex-situ soil remediation technologies such as stabilization, soil washing, dechlorination, and chemical extraction are more amenable to optimization. (EPA 1994) One way to optimize these technologies is to rely on physical and chemical technologies that enable the chemical/physical treatment of soil properties or the homogenization of soils. (EPA 1998d, EPA 1994).

In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase**

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[36] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

IV/Hazardous Soils/F-98-2P4F-FFFF)

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1988, September 1988, Technology Screening Guide for Treatment of CERCLA Soils and Sludges, Office of Solid Waste and Emergency Response, Washington, D. C. EPA 540/2-88/004.

EPA 1995, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460. (**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

g. Constraints on "innovative" technologies.

The constraints and restrictions on innovative technologies are significant. In the preamble to the LDR rule EPA does admit that incineration "is a matrix-independent technology that reduces the amount of material ultimately sent to land disposal and it destroys the hazardous constituents." In contrast "innovative" technologies like soil washing, biotreatment, dechlorination and chemical extraction require a high degree of pre-dilution and addition of pretreatment reagents that increase the volume of hazardous waste and residuals. Other significant restrictions apply. For example, biotreatment is limited to particle size of 0.85 mm, and requires a total solids content under 30%. Chemical extraction and soil washing are limited to hazardous constituents that are soluble to at least 5% in the extraction medium, and both are considered separation and not treatment technologies, since they yield residuals still requiring further treatment. In addition, soil washing is applicable only to sandy soil, and is not effective on clay soils or soils that contain significant humic content. Since most soils are heterogenous, soil washing can rarely be used.

Other "innovative" technologies also result in significant air emission problems. EPA states, for example, in the Soil BDAT Background Document, that for volatile constituents Biotreatment results in more volatilization of constituents and less real treatment. The aeration requirements for aerobic biotreatment are difficult to balance against the increased volatilization for volatile organics. Some thermal desorption technologies also result in elevated emissions, with levels of CO as high as 1700 ppm. In contrast, an incinerator is limited to 100 ppm CO in order to control emissions of PICs and dioxins.

More details on this matter are included in the ENSR report at Appendix E. As part of its comments on the Phase II LDR rule, the HWTC has contracted ENSR, in Acton, Massachusetts, to conduct a review of the known information on the performance of innovative technologies. ENSR is a leading firm in providing consulting and engineering design services for innovative technologies. ENSR has provided assistance in the design of technologies for many Superfund sites, including soil washing, biotreatment, and solvent extraction.

ENSR Consulting and Engineering is a nationally recognized environmental engineering firm whose expertise encompasses all aspects of hazardous waste process engineering and waste site work, form initial investigation through remediation and closure. ENSR has conducted either investigatory studies or remedial activities on over 4,000 hazardous waste sites, including RI/FS activities on over 200 CERCLA sites. ENSR's staff of approximately 1,200 technical experts ranges over 60 technical disciplines, and includes many former EPA Superfund, RCRA and state superfund managers.

ENSR's RI/FS and Corrective Measures studies have included evaluation and implementation of technology based clean-ups at a number of uncontrolled waste sites, including use of thermal desorption system at a PCB contaminated site in Massachusetts and a dechlorination system at a site in Texas. ENSR's engineers have also been involved in upgrades and tests at various incinerator facilities throughout the country.

The HWTC strongly supports the use of innovative technologies at remedial sites, and where applicable for process wastes. Our primary objection to the proposed LDR rule is the suggestion that BDAT needs to be relaxed in order to encourage the development of innovative technologies. Such relaxation is not justified, as the more reputable of vendors of innovative technology have made investments in designing these technologies to meet the same current BDAT standards that were developed on the basis of combustion technologies. The lowering of standards for innovative technologies is also a sign that EPA is encouraging the use of marginal treatment technologies, despite the demonstrated effectiveness of combustion technologies. In the same preamble discussion in the Phase II LDR rule, in which EPA tries to defend the need to reduce dependency on incineration, elsewhere EPA states the following to justify its proposed levels for universal treatment standards:

> "In summary, EPA believes it is appropriate to develop universal treatment standards on incineration because it is a matrix-independent technology that reduces the amount of material ultimately sent to land disposal and it destroys the organic hazardous constituents."

58 Fed. Reg. at 48099.

This description of incineration sounds like the kind of technology that should be encouraged for BDAT treatment, since it is available, effective on a wide variety of waste types, and results in the destruction of hazardous constituents. In contrast, EPA's definition of innovative technologies are those that "lack the cost and performance data necessary to support their routine use". A treatment technology is considered innovative, according to EPA, "if it has had only limited full-scale application". From the sounds of these definition, it seems that EPA is promoting less effective treatment, and is violating the very definition of BDAT.

Best Demonstrated Available Technology means technology that can achieve the best level of treatment demonstrated by a widely available technology. Innovative technologies must be required to design their treatment systems to meet the same level of treatment as the best. In addition, available means full scale operation. Much of the data presented in the innovative technology background document for soil, Docket #CS2P-S0599, is only bench or pilot scale data. Within the procedures EPA has adopted and used in all of the previous LDR rules, only full scale data was allowable. Many of our members were turned away when offering data to EPA for use in setting BDAT for previous rules because in EPA's view the data was not full scale enough. Yet for the sake of reducing dependency on a technology that is effective, but not politically comfortable, EPA is trashing its previous principles and procedures and encouraging the use of marginal and unavailable treatment technologies. This violates the intent of the LDR regulations.

To demonstrate this point, consider the table below summarizing the treatment technology availability obtained from the background document.

	PERCENTAGE OF AVAILABLE DEMONSTRATION DATA		
TECHNOLOGY	BENCH SCALE	PILOT SCALE	FULL-SCALE
Biotreatment	50%	32%	12%
Chemical Ext.	45%	55%	0%
Dechlorination	71%	14%	14%
Soil Washing	80%	13%	7%
Thermal Desorp.	27%	58%	15%

In contrast, all of the BDAT for incineration was based on full scale operations, at commercial facilities such as Rollins and Ensco. If these technologies do not satisfy the "available" criteria for BDAT, the EPA is not justified in relaxing BDAT treatment standards on the basis of these technologies.

In addition, form the data in the attached ENSR Report, in comparison with that presented in the Soil Background Document (CS2P-S0599), it is clear that EPA has included marginal treatment data in order to falsely justify raising the treatment standards to as high as 10 times UTS. EPA often included data on constituents for which the technology was not optimized. EPA's procedure in evaluating treatment data was to primarily consider analytical factors in whether or not to include a given data set for treatment of soil. The data used and grouped together in Tables 5-2 and 5-3 of the soil Background Document included data for constituents from remedial sites which were not the objective of the technology to treat. Certain technologies like soil washing or thermal desorption may have been selected to treat certain types of constituents, like volatiles, at a given site, yet EPA is grouping together data for constituents that the technology was not optimized for. Yet the technology could have been adjusted to provide better treatment performance for the most of the semi-volatile constituents. This results in a Table 5-2 which misrepresents the ability of the alternative technologies to meet existing treatment standards.

EPA also comments how widely applicable thermal destruction technologies are, and rightly states that thermal destruction is matrix independent. Yet this is not the case for many of the innovative technologies. The performance of the innovative technologies is highly varied, as shown in Appendix C to these comments. The table in Appendix C summarizes the performance data from the Soil Background BDAT Document (CS2P-30599). Several points are evident from this table. First, thermal destruction technologies had the best performance with an overall average percent treatment of 99.5%, with an upper 50th percentile average treatment of >99.9%, and with 61% of the constituents evaluated treated to greater than 99.9%. All of the other innovative technologies had average percent treatment of 67.6% to 98.8%. In addition, the percentage of constituents treatable to a level in excess of 99.9% ranged from 0 to 9%, in comparison with 61% for the thermal destruction technologies. Many constituents were treatable to only levels below 20%, while the lowest level of treatment demonstrated for thermal destruction technologies was 95.6%. Table 5-3 from the Soil Background Document, included in Attachment C, shows a side-by-side comparison of thermal destruction and the Innovative technologies. Many types of constituents, such as halogenated aliphatics and PNA's had 0% treatment for the innovative technologies, whereas the lowest performance of incineration was 97%.

It is clear from the above data that thermal destruction technologies have demonstrated superior performance to the innovative technologies evaluated by EPA. It is insane that EPA is proposing to relax BDAT to reduce the dependency on a superior treatment technology. The data speaks for itself. In addition, thermal destruction is properly called a matrix independent technology. A review of the Soil Background Document and the attached ENSR report present some of the limitations of these technologies. Examples include the following:

Biotreatment technologies are limited to particle sizes less than 0.85 mm. The waste must be diluted to a solids range of 5 to 30% in order for the technology to be applied. The maximum TOC content that is treatable is 3%. The issue of aeration is a complicated one for aerobic biotreatment of volatile organics. If the aeration rate is too high, that more volatilization of hazardous constituents occurs as opposed to actual treatment. On the other hand, if the aeration rate is too low, then treatment is incomplete. Therefore, the technology is not generally applicable to volatile constituents, and treatment data on volatiles is difficult to interpret since the reductions in contaminants experience may be more due to volatilization as opposed to treatment. Another problem with biotreatment is that it is not applicable to many commonly encountered hazardous constituents. The attached report discusses these limitations, and the fact that PAHs, PCP, many chlorinated solvents, chlorinated aromatics, chlorinated biphenyls, pesticides and nitroaromatics are not amenable to biotreatment. In addition there has been little done to identify and characterize the breakdown products of biotreatment, which often can be hazardous constituents. In essence these degradation products represent the same issue presented by PICs produced by thermal destruction, but their concentrations are much higher. The typical treatment times required for biotreatment are also a significant limitation, with a range of 28 to 164 days required. This translates into a treatment rate of 0.1 lbs/hour, vs several thousand lbs/hour for thermal destruction technologies. The technology is not judged to be applicable to process wastes.

Also attached at Appendix D is an excerpt from a report by the National Research Council concerning In-Situ Bioremediation. Table 2-1 of this study identifies bioremediation as “established” for only two subsets of contaminants, petroleum products and alcohols, ketones and esters. All other classes of hazardous constituents are only described as “emerging” or “possible” in applicability to treatment using bioremediation. It appears that this panel of NRC experts does not consider bioremediation to be a demonstrated technology for a wide variety of contaminant profiles, regardless of site characteristics.

Chemical Extraction technologies are also limited in applicability to particle sizes under 1.2 cm. In addition, the hazardous constituents must be soluble to a level of at least 5% in the extraction medium, in order for the technology to be effective. Oversized materials are not treated but are merely separated for alternative treatment. The waste must be highly diluted before treatment can be initiated, to a level of 2 to 30%, and oil and grease must be restricted to less than 40%. Total organic carbon is restricted to less than 30%. For these reasons the technology is not generally applicable to most organic contaminated process wastes, with the exception of petroleum refining wastes. Soil must contain less than 30% clay, and soils high in humus content cannot be treated. The volatile constituents in the soil may be simply volatilized and not treated. The volatile constituents in the soil may be simply volatilized and not treated. The technology has been demonstrated on a full-scale to be only applicable to certain semi-volatile constituents. The major factor to keep in mind is that chemical extraction is a form of separation technology, and not treatment. The separated phases containing concentrated hazardous constituents must still undergo further treatment. Thermal Destruction technologies do not present any of these limitations.

Soil Washing is also another separation technology, that has similar limitations to chemical extraction. It is difficult to apply to clay soils, and at least 50% of the soil matrix must be of a sandy nature. Particle size must be reduced to less than 12.5 mm, and oversized materials must be treated under another technology. Likewise, since it is a separation technology, the resulting residuals still require subsequent treatment. Like chemical extraction, the constituents must be soluble to a level of 5%, for the separation to be effective. Soils with high humic content are not applicable to the technology. Since the technology depends on contamination being primarily associated with fine particle size materials, like soil, it is not applicable to process wastes. Also high carbon content soils, such as loam, are not applicable to soil washing (see Appendix E). Table 2 in the ENSR report in the section on soil washing presents the chemical applicability of soil washing. Full scale demonstrations for soil washing have been completed for certain semivolatile constituents. The technology has only been evaluated on a bench or pilot scale for volatile constituents and pesticides. Table 4 of the attached ENSR report in the section on soil washing, provides the limitations of the technology. The limitations are extensive; for example the technology is not applicable to viscous materials and volatile constituents are released and not treated. Thermal destruction technologies are not subject to these limitations.

The attached ENSR report on vitrification presents the scope, status and limitations of this technology. The technology is limited to an organic content of less than 10%, and is therefore not applicable to most process wastes. The technology is primarily an immobilization technique, and the hazardous constituents are encapsulated in a glass like matrix. This may be acceptable for metal constituents, for which BDAT is based on leachability, but this is not acceptable for organic constituents for which BDAT is based on total constituent analysis. In essence the contamination is left in place, merely sealed in a matrix. There are also significant issues with air emissions, especially since this technology is not as highly regulated as thermal destruction. The fact that heat is applied and volatilization of organics and volatile metals can occur, means that substantial investment in effective off-gas cleaning equipment must be made.

Infrared treatment technologies have limitations with regard to the physical form of the waste. The waste must be solid, passing the paint filter test in order to be amendable to this technology. This limitation makes this technology not directly applicable to process wastes, and limited only to dry soils. In addition, the particle size must be less than 3 cm. The moisture content must be below 15% and the organic content must be limited to below 5%. As discussed in the attached ENSR report, the emissions are a major concern, and extensive control technologies must be applied. Also, halogenated wastes must be restricted since these materials result in corrosive gases that attack the process equipment. Thermal destruction technologies are not subject to these limitations.

Soil vapor extraction (SVE) technologies are limited in applicability to volatile constituents, which are the only constituents that have been demonstrated in performance on a full scale basis. Again, as with many of the other innovative technologies, the scope of SVE is simply separation and not final treatment. Large quantities of residuals are generated that still require treatment. There are major limitations on soil characteristics as discussed in the attached ENSR report. There are also major air pollution control issues that must be addressed. These restrictions are not an issue with Thermal Destruction technologies.

Thermal Desorption technologies are also limited in applicability, that is masked by the fact that certain technologies, like the Canonie process, are operated more like incineration than thermal desorption. The attached report discusses the limitations of this technology. The technology is primarily separation, and to be true desorption the hazardous constituents in the off-gases must be condensed and then either treated or recycled. There are three byproduct streams created: condensed organic phase, an aqueous phase and a solid residue. All of these streams require further treatment or recycling. In addition, the air emissions must be controlled, which may be an issue since standards as stringent as incineration are not applied. The particle size of the technology is limited to 3 cm, which makes the technology limited in applicability to soil, and not process wastes. Water content must be as low as possible, but always less than 50%. The issue with air emissions is emphasized in the Soil BDAT Background report which states that levels of carbon monoxide emissions as high as 1700 ppm have been observed from certain units. These units function more like incinerators, and in many cases combustion can be occurring more than desorption. The HWTC has petitioned EPA to properly regulate these units to limit their scope of true desorption, since incineration must meet the full scope of Subpart O standards.

In addressing the question of the appropriateness of using thermal desorbers to remove certain hazardous constituents from contaminated soil, EPA must ensure that these devices are properly regulated to protect human health and the environment.

As we stated in our July 13, 1993, rulemaking petition, a growing number of desorbers employ combustion step in treating soils and sludges. These devices are not true desorbers. Instead, they are hybrids: partially engaged in desorption and partially engaged in incineration. To the extent the unit is burning hazardous wastes, the Subpart O performance standards and operating controls must apply. Even if device is truly engaged in desorption, an unreasonable risk to human health and the environment would be posed from emission of harmful combustion by-products if the unit is also burning some of the constituents without meeting incinerator standards. Full Subpart O requirements must therefore be met for all desorbers that burn hazardous wastes.

Moreover, we disagree with the Agency's approach stated in the appendix to the proposal, that desorbers and incinerators should be distinguished based on their purposes. As stated in our petition of July 13, the proposed test is inappropriate, for it is wholly unrelated to impacts on human health and the environment, and it is inconsistent with existing EPA policy to make distinctions based on what actually occurs in the unit, not on the operator's intent.

As stated in the attached letter we recently sent to EPA (Appendix 1), to better distinguish between desorbers and incinerators, the Agency should revise the definition of "incinerator" in 40 C.F.R. Section 260.10 so that Subpart O standards apply to any device that:

> "Neither meets the criteria for classification as a boiler or carbon regeneration unit, nor is listed as an industrial furnace, and uses heat and oxygen to oxidize organic materials at temperatures exceeding 300o F whereby more than 5 percent of the organic materials are either (a) totally or partially converted to non-condensable gases at standard temperatures and pressures or (b) emitted to the atmosphere."

The chemical applicability of the technology is shown in Table 10 of Appendix E, in the section regarding thermal desorption. As can be seen, high temperature thermal desorption is applicable to most types of organic constituents, while low temperature is not applicable to semi-volatiles and pesticides. Although thermal desorption is not as limited in applicability as other innovative technologies, there are more restrictions with regard to matrix characteristics. Thermal destruction does not suffer any limitations with regard to matrix characteristics.

In conclusion, thermal destruction has the widest applicability and the greatest effectiveness in treatment of hazardous constituents in both soil and process waste matrices. The review conducted in the attached ENSR report and of the Soil Background BDAT document prepared by EPA demonstrate that the "innovative" technologies have significant limitations, and although they may be useful in certain treatment scenarios, the technologies are not at a stage in which massive revisions of the entire BDAT basis of the LDR program can be considered. In light of the attached information on limitations, it is outrageous for EPA to even suggest relaxation of BDAT treatment standards in order to encourage more innovative technologies, when these technologies are so limited in applicability. In addition, a protective LDR program focus on environmental quality would demand that these technologies perform to the same level of effectiveness as the best demonstrated technology, and not relax the standards to encourage substandard treatment. EPA claims in 58 Federal Register 48126 that it is "presenting this approach to provide safer, more cost effective" treatment for remedial wastes. As shown below, the cost is no different. In addition, the above discussion demonstrates that these technologies are not safer, but are generally less safe. If higher levels of contaminants are incorporated into treatment residuals that are later land disposed, and if air emissions are higher, it is unreasonable for EPA to label these technologies as safer. An objective consideration of the performance data for all technologies does not support EPA abandoning thermal destruction in favor of less safe and effective treatment levels.

Response: The commenter points out to various soil properties or characteristics that may limit or preclude the use of the non-combustion technologies supporting the treatment limits established for hazardous soils. EPA refers to these soil properties or characteristics as soil characteristic affecting treatment performance (SCATP). SCATP are discussed in EPA 1993a; EPA 1998a; EPA 1998d; EPA 1994; and EPA 1988. The HWTC identified various scenarios that could preclude the use of a non-combustion technology. Further, the commenter argues that EPA has retained treatment data that resulted from treatment systems that were not well operated and designed for the whole of purpose of justifying relaxation of the treatment standards. Finally, the commentor points out to various RCRA policy issues, in particular, what kind of regulatory controls various non-combustion technologies should be required to have and presumably, asks EPA to address these comments in the final rule.

In summary, the commentor points out to different performance ranges that show the superiority of combustion and other thermal treatment processes over chemical and biological treatment processes. Based on these treatment data comparison, the HWTC believes that the treatment standards in the 40 CFR 268.48 should be revised since presumably thermal destruction and thermal desorption processes can treat hazardous soils. Also, the commenter feels many of the non-combustion technologies in the soil data base were not properly optimized and thus, the reported treatment ranges may be biased. In the ENSR report (HWTC 1993), ENSR concludes that although some of these technologies may be amenable to optimization, the cost will be too high that com- bustion will be the best option to enable remediation . The ENSR report also submitted performance data from various vendors/literature sources who have operated non-combustion processes at the bench-, pilot-, or full-scale. (See HWTC 1993.) These corroborative supplemental treatment data are in agreement with the treatment performance data comprising the soil data base. (See Appendices in HWTC 1993 vis a vis Appendix D in EPA 1998d.)

<u>Soil Characteristics Affecting Treatment Performance</u>
EPA discusses similar findings to those SCATP emphasized by the commenter in Chapter 2 of EPA 1994, in particular, the overall, impact of soil textures or particle size distributions:

“Soil particle-size distribution is an important factor in many soil treatment technologies. In general, coarse, unconsolidated materials, such as sands and fine gravels, are easiest to treat. Soil washing may not be effective where the soil is composed of large percentages of silt and clay because of the difficulty of separating the adsorbed contaminants from fine and from wash fluids. Fine particles also can result in high particulate loading in flue gases from rotary kiln as a result of turbulence. Heterogeneities in soil and waste composition may produce nonuniform feedstreams for many treatment processes that result in inconsistent removal rates. Fine particles may delay setting and curing times and can surround larger particles, causing wakened bonds in solidification/stabilization processes. Clays may cause poor performance of the treatment process as a result of caking. High silt and clay content can cause soil malleability and low permeability during steam extraction, thus lowering the efficiencies of the process."

However, EPA believes that many SCATP, such as soil texture/particle size distribution, can be addressed by homogenizing the soil, by optimizing the design and operation of the selected treatment processes, or by the combined use of two or more treatment technologies. (EPA 1998a, EPA 1998d, and EPA 1994.)

Achievability of the Treatment Standards

Although some of the soil physical-chemical characteristics (SCATP) emphasized by the commenter will limit the availability of a non-combustion technology at a site, another non-combustion technology or technology train for the soil textures at the site may still enable the use of non-combustion technologies. For example, the commenter emphasizes how impractical it would be to apply soil washing to soils with high humic content. Because humic content in the soil increases the adsorption of organics, other technologies designed to target the removal of organics in hazardous soils can be used. For example, composting can treat organics and humics in hazardous soils. Chemical extraction can also be operated to allow the sequential- multiple extractions of acidic, basic, and neutral organics from soils. Finally, physical and chemical treatment of the soil (e.g., screening and particle sizing, chemical treatment and dewatering, and pH adjustment) followed by thermal desorption may still be an options for such soils.

As shown in Chapter 4 and supporting Appendices of EPA 1998a, the soil data base adequately describe the treatment of various soil textures ranging from difficult-to-treat clays/silts to easier-to-treat coarse/sands. Soil texture/particle size distribution is among one of the most important soil characteristics to know because this soil characteristic parameter may be used to screen the applicability of certain remediation technologies. EPA believes that these data base show the ability of non-combustion technologies to treat various soil textures.

In other instances, particle size distribution enable the identification of adequate pre-treatment steps or specialty/ancillary equipment that can help in the treatment of the contaminants by an appropriate non-combustion treatment technology.

The soil data base also include a few data points describing the treatment of oily/ acidic petroleum-sludges. These particular streams can mimic the treatment of soils that have clay/silts as the dominant soil texture. Further, the soil data base show the effectiveness of various technologies in treating difficult-to-treat soil textures and difficult-to-treat constituents such as PNAs (4 and 5 more rings), dioxin and furans, and creosote admixtures. There are other instances were the technology may be inappropriate for one or two clusters of organic or metal groups and such constituent clusters may require further treatment by another appropriate technology.

Corroborative data in the 1995 and 1997 Superfund studies[37] also show that soil variability can be managed by optimized ex-situ full-scale treatment processes. For instance, these Superfund 1995 and 1997 studies document the following approaches to treatment optimization:

1. Soil homogenization[38] - involves the use of ex-situ physical/chemical (p/c) processes to reduce soil heterogeneities that may inhibit treatment performance. P/C processes can be used to screen and segregate fines from large soil fractions, to mix soils with less contaminated/clean soils such that soil malleability can be improved, or to treat other dominant soil physical/chemical characteristic in order to facilitate or to enhance treatment.

Another technique is the selective excavation of soils.[39] This technique involves the combined use of visual inspections, adequate site characterization data on soil texture variability and contaminant distribution, historical site management practices, and field sampling testing equipment/protocols in order to screen vertical soil bands or horizontal soil that can be selectively excavated to undergo treatment. This other technique is routine to the excavation and remediation of hazardous soils.

2. Technology design - involves an understanding of the contaminants in the soil, soil properties that can inhibit treatment, the extrapolation of empirical data from feasibility pilot-/bench-scale studies to full-scale operations. The extrapolation of empirical data also involves the exercise of sound engineering judgments with regard to soil/contaminant characteristics that can cause material handling problems, identification of ancillary or specialty equipment units that can be installed to lessen such material handling problems, and designing the right sequence these equipment ought to be installed and operated.

3. Technology operation - involves various trial and error steps that operators follow in

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[37] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

[38] See description of soil screening and separation processes that enable the treatment of difficult-to-treat clay/silty soils via bioremediation and the soil washing of sludge/soil bands; respectively, in the following Superfund 1995/1997 full-scale ex-situ treatability studies: (1) Slurry Phase Bioremediation at the Southern Wood Preserving Superfund Site, Canton, Mississippi , in p. 83, EPA 1997b and (2) Soil Washing at the King of Prussia Technical Corporation Superfund Site, Winslow Township, New Jersey, in p.36 through 38 of EPA 1995b.

[39] For example, see the selective soil excavation technique described in the corroborative full-scale Superfund study titled: Soil Washing at the King of Prussia Technical Corporation Superfund Site, Winslow Township, New Jersey, in p.35 & 36 of EPA 1995a.

scoping the operational parameters that can be sustained to harness the capabilities of the technology to treat the contaminated soils and thus, meet the technology pre-designed treatment objectives. For instance, operators may identify key resistant or difficult-to-treat hazardous constituents to monitor for, and then optimize operational parameters that enhance the removal or destruction of such contaminants. For example, the operator may operate the treatment process at a higher temperatures, an optimum pH range, a greater ratio amount of reagent-to-contaminant, or at the upper range of the technology designed treatment range provide for longer residence time.

Regulatory status of non-combustion technologies

The commenter raised various regulatory issues spanning from lack of controls on air emissions from biological treatment processes to the kind of RCRA controls that the commenters believe should be required on vitrification and thermal desorbers. Although EPA is not addressing these particular issues in today's final rule, EPA points out that the development of Maximum Achievable Control Technology for abating the emission of Hazardous Air Pollutants from various emission sources at remediation sites are an on-going regulatory efforts pursued by EPA.

EPA notes that the regulatory status of non-combustion devices is an issue that RCRA permit writers at EPA Regional/authorized state offices routinely address within thecontext of the permit process and other omnibus permit writer authorities. Therefore, EPA is not addressing these particular comments in this rule.

EPA notes, however, that although hybrid thermal desorbers employing "combustion gases" or "after burners" to abate gaseous or volatile emissions from thermal desorbers are likely candidates to be required combustion controls under 264, Subpart O, or equivalent controls under Supart X, EPA believes that the convention of designating these devices as thermal desorbers is still valid for the purpose of developing treatment standards for hazardous soils. This is because these hybrid thermal desorbers can be re-engineered to operate in the absence of combustion gases or after burner combustion devices. This premise is based on the performance of other thermal desorbers that operate in the absence of combustion gases and after burner controls. Three treatability studies in the soil data base describe the treatment of hazardous acidic petroleum sludges and of creosote/PCP contaminated soils support this point. One study is the bench-scale thermal distillation of petroleum refining sludges by Southdown Thermal Dynamics. The second study describes TDI Services, Inc's full-scale thermal desorption of simulated wood preserving soils. And the third study, describes the pilot scale thermal desorption of a rail road treating site by a "screw-auger" thermal desorber system.

Treatment of multi-constituents by a single technology

The commenter feels that any data points that fall short from the combustion based limits in the 40 CFR 268.48 do not warrant any consideration for rulemaking.

EPA disagrees with the commenter.

In arriving at non-combustion based treatment levels, the EPA has examined the available non-combustion treatment performance data within the context of what treatment levels of performance are demonstrated for as difficult-to-treat clusters of chemical family analytes or chemical treatability groups by the various technology studies in the soil data base (EPA 1998a, EPA 1998d, EPA 1993a.) For instance, the treatment of an admixture of organic constituents in hazardous soils via air/steam stripping is often an appropriate treatment for volatile hazardous constituents. The technology often attains an inferior performance, however, with regard to the removal of many semi-volatile and non-volatile organics (EPA 1998a). However, EPA believes that by adding another appropriate treatment step to the steam stripped soils, the concentrations of semi-volatile and non-semi-volatile organics can attain the treatment limits. (EPA 1998a)

Also, EPA notes that the treatment regime pursued by pilot-scale and full-scale studies in the soil data base were not necessarily intended to meet a 90% reduction limit or a pre-determined UTS limit. In other instances, EPA believes that excursions from the treatment standard supported by the available data were the direct result of soil variability or heterogeneities in the soil being treated. Like the commenter, EPA believes that such excursions can be adequately addressed with the routine monitoring of key treatment performance indicator constituents and other operating parameters that can provide the soil with adequate treatment. (See EPA 1998d.)

Furthermore, in this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediation, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

EPA strongly disagrees with the comment that the soil data base "falsely" retains data points from processes that lacked optimization or where the technology was inappropriately applied. EPA notes that admixtures of hazardous constituents occur at many hazardous sites and it is thus appropriate to examine the data as is, what constituents are being treated. EPA has also determined that soil heterogeneities occur yielding treated soils that deviate from treatment objectives. EPA addresses these issues in Chapter 4 of EPA 1998a and EPA 1998d.

The treatment performance reduction levels that clusters of BDAT analytes and contaminated soil and debris treatability groups have attained in the tested technologies is discussed in EPA 1998a; EPA 1998b; and EPA 1998c. Although the treatment performance data in the soil data base are in agreement with the premise that thermal destruction and thermal processes are generally less soil-constituent matrix dependent, the treatment data show that other non-combustion technologies can arrive to a reasonable regime of treatment levels that are allowed by the statue. (See preamble discussion of today's final rule in Section VII. (8); EPA 1998b, and EPA 1998c.)

In conclusion, EPA believes that the concerns expressed by the commenter are adequately addressed. The corroborative data show that many of the issues raised by the commenters can be adequately addressed within the context of treatability feasibility studies which are an integral part of soil remediation activities under both RCRA and CERCLA programs. Further, the treatment performance of ex-situ full scale operations (bioremediation, thermal desorption, and soil washing) in the 1995 and 1997 Superfund studies are congruent with the treatment performance that these technologies achieved for similar difficult-to-treat hazardous constituents and harder-to treat soils in the soil data base described in EPA 1998a.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number

3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

h. Arbitrary action discourages investment.

If EPA can arbitrarily "demote" combustion technologies today and exercise a bias for other technologies that it chooses to call "innovative" – all without scientific or environmental basis – it can similarly arbitrarily "demote" other technology tomorrow. Just two years ago EPA considered incineration to be "innovative" technology, and relied on this technology to move the nation away from land disposal of untreated hazardous constituents.

EPA understandably wishes to see many technologies flourish. However, it must bear in mind the purpose of that goal. The purpose of having many treatment technologies is to increase the opportunity for minimizing threats to human health and the environment. When EPA instead considers setting more lax treatment standards in order to encourage additional technologies, it is totally losing sight of the gal of minimizing threats and is frustrating pollution prevention.

Moreover, EPA would be incorrect if it things that this approach would encourage significant investment in additional technologies. Any policy based on arbitrary considerations, such as this one, rather than on objective scientific criteria, will ultimately discourage investment. Investment decisions depend in large part on having established, understood rule of the game, rather than changing, arbitrary ones that cannot be relied upon over the periods of time necessary to amortize new investments. When incineration was considered "innovative" technology by EPA, many companies invested millions of dollars to construct plants that fully comply with all standards for safety and environmental protection. Now this investment is threatened by EPA's new arbitrary preferences. Who is to say that biotreatment, soil washing or solvent extraction will not receive similar arbitrary demotions from EPA in the future? EPA and the Administration are not encouraging investment in environmental protection technology with this message. Such arbitrary actions, such as EPA is displaying against thermal destruction technologies, are a major disincentive for investment in development of innovative technologies, especially considering that only 3 years ago thermal destruction was viewed by EPA as 'innovative and desirable' technology." (Hazardous Waste Treatment Council, CS2P-00060)

Response: The treatment standards promulgated for hazardous soils are not arbitrary and capricious. EPA has explained in the preamble EPA's rationale for the need to arrive to a reasonable regime of treatment levels that can address the variabilities of soil/contaminant matrices that routinely arise within the context of remediation scenarios. The soil data base adequately documents the various concentrations and numerous soil textures that warrant today's treatment levels, and most important, the capabilities of non-combustion technologies on appropriate treatability clusters of hazardous constituents. (See Chapter 4 of EPA 1998a, EPA 1998c, and EPA 1998d.)

The Agency reiterates that, in the remediation context, in assessing whether threats posed by land disposal have been minimized, one should appropriately consider the risks posed by land disposal have been minimized, one should appropriately consider the risks posed by leaving previously land disposed waste in place as well as the risks posed by land disposal of waste after it is removed and treated. 62 FR 64506 (December 5, 1997). For example, if a treatment standard for organic constituents based on performance of incineration typically results in already land disposed materials such as contaminated soils being capped in place rather than more aggressively remediated, threats posed by land disposal of the waste ordinarily would not be minimized. Conversely, a treatment standard that results in substantial treatment followed by secure land disposal can be said to minimize threats, taking into account the totality of threats posed (i.e. including those posed if the soil were left in place untreated). Id. The soil treatment standards will ordinarily ensure that contaminated soil is treated to satisfy RCRA Section 3004(m), considering both the threats posed by new land disposal of treated soil and the threats posed by on-going land disposal of existing contaminated soil (e.g., if the soil were left in place untreated).

For soil contaminated with organic constituents, EPA has noted many times that, notwithstanding the fact that such soils can be burned, it is generally unsuitable or impractical from a technical standpoint to burn large volumes of mildly contaminated soil. See, For example, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806-18808 (April 29, 1996). In addition, the Agency has documented potential difficulties that may arise from the combustion of soil due to soil/contaminant characteristics that affect incineration performance such as the concentrations of volatile metals, the presence of alkali salts, fine particles of soils such as clays and silts, and the ash fusion point of the contaminating waste.

For example, operation of an incinerator at or near the waste ash fusion temperature can cause melting and agglomeration of inorganic salts; the loading of clays and silts in some soils may also result in high loadings of particulate matter in flue gases. See *Proposed BDAT Background Document for Hazardous Soils*, August 1993 and *Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988.

Thus, in response to the commenter's major premise, EPA's goal in this rule is not to promote non-combustion technologies. Rather, it is to promote remediation which includes treatment of soil, which in this context for the reasons just given means treatment standards (for organics) which can be achieved by non-combustion technologies.

Choices about which soil treatment technology to apply should be informed by appropriate use of bench and pilot scale studies and good engineering judgement. EPA acknowledges that the treatment efficiency necessary to achieve the soil treatment standards will depend on, among other things, the initial concentrations of hazardous constituents in any given contaminated soil. Thus, not all soil treatment technologies will be capable of treating every contaminated soil to meet the standards adopted in this rule. However, the Agency finds that the standards typically can be achieved by at least one of the demonstrated technologies, even in the case of hard-to-treat hazardous constituents such as dioxins and furans, polychlorinated biphenyls, and polynuclear aromatics.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

- "In Table 1 within this proposed rule, the EPA has published a listing of treatment technologies that we believe meet this criteria and are therefore available for treating hazardous soil. The EPA has based this option on data collected from CERCLA remedial actions, demonstrations under the site program, industrial sources and EPA sponsored treatment tests. The EPA has divided the technologies into the following nine general categories:

  a. Biological Treatment
  b. Chemical Extraction
  c. Dechlorination
  d. High-Temperature metals Recovery
  e. Solidification/Stabilization/Immobilization
  f. Thermal Desorption
  g. Thermal Destruction
  h. Vitrification
  i. Soil Washing

The individual reports for these technologies have been included with this report as attachments A through I and the reader is referred to these attachments for specific discussion of the individual technologies. The conclusions from these reports have been summarized in Table 1. While some of these technologies are intriguing and offer promise for the future, as can be seen in this table, the quantities of materials that have been processed for evaluation by BDAT screening criteria are small. Further, few of these technologies have been demonstrated with data that has been rigorously subjected to QA/QC review. Finally, few of these technologies are classified as destruction processes. Rather they are essentially separation process which rely heavily on other off site processes to accomplish destruction of the contaminants of concern. This is true even of some of those processes which purport to be destruction processes. Such is the case of the APEG family of dechlorination technologies. While the technology may be capable of complete dechlorination, process economics do not allow it. Rather than completely destroying the chlorinated contaminants, they are instead simply converted to other materials to which the analytical procedures for the original contaminant do not respond. This is recognized in the permitting process for these technologies resulting in incineration of residuals being an integral part of the permit for this process.

In summary, fixed facility off site incineration remains as the only technology fully demonstrated to be capable of destruction of a wide range of the contaminants of concern. Further, it is the only technology consistently shown by such demonstration to be capable of high destruction efficiencies to low concentration levels." (Hazardous Waste Treatment Council, CS2P-00060.E) **GREEN FILE LABEL**

Response: EPA disagrees with the commenter's conclusion that combustion is still the only technology that is capable of achieving the treatment standards. The HWTC's findings are not supported by the soil data base and other corroborative published literature. (See EPA 1998a and 1995 and 1997 Superfund treatability studies[40] describing ex-situ and in-situ treatment processes. Further, the HWTC has submitted treatment data from other published treatability studies that meet the treatment standards (HWTC 1993).

EPA agrees, however, with another HWTC finding (HWTC 1993) that there would be instances were multiple-contaminants or difficult-to-treat soils may require a treatment train to attain the treatment standards. The feasability of such treatment trains in achieving the treatment standards for hazardous soils are documented in Chapter 3 of EPA 1998a.

Also, EPA agrees with HWTC/ENSR's comment that other remediation residues from non-

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[40] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

combustion technologies (i.e., sludges with hazardous contaminants, spent solvents with trace or concentrated amounts of hazardous constituents, etc.) may require further treatment prior to land disposal. However, treated soils that meet the treatment standards may be land disposed.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- "Appendix C

  Tables summarizing performance of innovative technologies based on information obtained from EPA's BDAT Background Document for Soil - Docket #CS2P-S0599." (Hazardous Waste Treatment Council, CS2P-00060.C) **GREEN FILE LABEL**

Response: EPA acknowledges HWTC's argument that thermal destruction and thermal desorption processes can achieve greater removal rates than other non-combustion technologies. Also, this Table show the percent of data points that can meet the treatment standards being promulgated today. Similar, Tables reporting similar information on a technology and chemical BDAT analyte or Contaminated Soil and Debris treatability group cluster basis can be found in Chapter 4 and Appendices of EPA 1998a; Chapter 5 of EPA 1993a; EPA 1998b; and EPA 1998c.

The Agency reiterates that, in the remediation context, in assessing whether threats posed by land disposal have been minimized, one should appropriately consider the risks posed land disposal have been minimized, one should appropriately consider the risks posed by leaving previously land disposed waste in place as well as the risks posed by land disposal of waste after it is removed and treated. 62 FR 64506 (December 5, 1997). For example, if a treatment standard for organic constituents based on performance of incineration typically results in already land disposed materials such as contaminated soils being capped in place rather than more aggressively remediated, threats posed by land disposal of the waste ordinarily would not be minimized. Conversely, a treatment standard that results in substantial treatment followed by secure land disposal can be said to minimize threats, taking into account the totality of threats posed (i.e. including those posed if the soil were left in place untreated). Id. The soil treatment standards will ordinarily ensure that contaminated soil is appropriately treated within the meaning of RCRA Section 3004(m), considering both the threats posed by new land disposal of treated soil and the threats posed by on-going land disposal of existing contaminated soil (e.g., if the soil were left in place untreated).

For soil contaminated with organic constituents, EPA has noted many times that, notwithstanding the fact that such soils can be burned, it is generally unsuitable or impractical from a technical standpoint to burn large volumes of mildly contaminated soil. See, For example, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806-18808 (April 29, 1996). In addition, the Agency has documented potential difficulties that may arise from the combustion of soil due to soil/contaminant characteristics that affect incineration performance such as the concentrations of volatile metals, the presence of alkali salts, fine particles of soils such as clays and silts, and the ash fusion point of the contaminating waste. For example, operation of an incinerator at or near the waste ash fusion temperature can cause melting and agglomeration of inorganic salts; the loading of clays and silts in some soils may also result in high loadings of particulate matter in flue gases. See *Proposed BDAT Background Document for Hazardous Soils*, August 1993 and *Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988.

■ "Critique of Proposed Soil BDAT And Soil Treatability Database

-- Limited innovative technology data available (295 tests for 9 technologies).

a. Total of 2540 data pairs for 80 constituents (average of 3 ½ data pairs per constituents per technology).

b. Data from 80 constituents extended to 232 constituents.

c. 85% of tests in database on < 1000 kg (5 drums) of soul, 40% of tests in database on < 1 kg (1 quart) of soil.

d. EPA increased the minimum treatability sample size for media contaminated with non-acute hazardous waste to 10, 000 kg (59 Fed. Reg. 8362 (Feb. 18, 1994).

e. Contaminated soils are highly heterogeneous, both physically and chemically - small samples are unrepresentative.

f. Bench/pilot scale tests in database are unrepresentative of both process variability and scaled up performance.

g. Constituent by constituent analysis underlying proposed UTS does not reflect performance of any given technology on typical range of constituents in soil matrix.

h. Any given innovative technology has (often widely) varying degrees of efficiency for different constituents.

i. Very strong concern that innovative technologies will seldom meet the stringent proposed BDATs for all of the different constituents in soil.

j. Suggests only incineration will achieve proposed BDATs on many soils (more uniform treatment efficiency across constituents).

k. Appears inconsistent with HWIR policy goal of using innovative technologies." (RCRA Corrective Action Project, CS2P-00164.D)

Response: EPA disagrees with the comment that the proposed treatment standards can only be achieved by combustion technologies. For contaminated soil, the Agency has chosen to establish technology-based soil treatment standards at levels that are achievable using a variety of common remedial technologies which destroy, remove or immobilize substantial amounts of hazardous constituents. 58 FR 48129 (September 14, 1993).

The commenter also raised several issues regarding EPA's data base, treatability data analysis, the scale of treatability studies, and the applicability of non-combustion technologies to multiple-contaminants at hazardous sites. The issues raised by the commenter are clustered into general categories and they are addressed below.

Description of the soil data base supporting today's treatment standards for hazardous soils

Regarding number of hazardous constituents tested, data points, and the scale of tests comprising the data base, see EPA 1998a and EPA 1993a.

Scale of treatability studies and rationale to extrapolate the available treatment performance data to other Underlying Hazardous Constituents

EPA concurs with the commenter that it is desirable to have larger sample sizes, generally, when conducting feasibility studies. Also, EPA points out that there are full- scale data for biotreatment processes (five studies), chemical dechlorination (one study), stabilization (three studies), steam stripping (four studies), and thermal desorption (six studies) in the soil data base. (See Appendix D in EPA 1998a.) The bench- and pilot- scale data for these full-scale processes in the soil data base further corroborate the feasibility for transferring the proposed treatment standards. However, EPA has found that regardless of the sample size being examined, the extrapolation of bench-/pilot-scaledata to the scaling of full-scale operations is often an empirical and site specific process that require the exercise of good engineering judgement and the conduction of trial and error operations. Other consulted treatability studies (EPA 1998a, EPA 1988d, EPA 1994) show that full-scale ex-situ processes;[41] such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a.) EPA has also found that the treatment performance ranges attained by the treatability studies in the soil data base meet are congruent with those reported in other consulted literature including literature that describe full-scale operations. (See Chapter 3 in EPA1998a, cited references in EPA 1998d, and ex-situ treatment studies in 1995 and 1997 Superfund treatability studies,[42] and other literature cited below.) Further, the soil data base describes the treatment of difficult-to-treat soil textures and difficult-to treat admixtures of hazardous constituents/multiple-contaminants (see Appendix D in EPA 1998a and EPA 1998d). In all cases, at least some of the data shows that the soil

[41] Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

[42] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

standards have been achieved on difficult-to-treat matrices or soils contaminated with hard-to-treat constituents using full scale treatment. Based on these findings, EPA is proceeding with the proposed treatment standards for hazardous soils.

In evaluating what paired data points were suitable as a basis for the Phase IV hazardous soil treatment standards, EPA did examine for possible bias in the consulted studies and rejected data points that resulted from bench-/pilot- scale data and operational practices that result from atypically designed and operated full-scale operations. For example, the Data Summary Form (DSF) Number 76 A, biotreatment, was rejected because the treatment batch test involved a bed that was tilled daily and continuously aerated. Clearly, DSF Number 76 is an atypical practice of full scale biotreatment process operation. A full scale operation may involve, instead, the aeration of soils twice a week. See Chapter 5 of the BDAT Background Document for Hazardous Soil, August 1993, for a discussion of the criteria EPA adopted for the review and evaluation of the available data in this docket. Also, see EPA's findings on these data review and evaluation can be found in administrative record. (EPA 1993a.)

Other consulted treatability studies/literature (EPA 1998a, EPA 1988d, EPA 1994) show that ex-situ processes[43]; such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a) Based on these findings, EPA is not persuaded by the commenter's recommendation that the proposed mass based thresholds are adopted for the purpose of analyzing what available treatment data may be suitable for rulemaking.

In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

The available data are adequate to describe soil variability and multiple-constituent remediation scenarios

EPA agrees with the commenter that soils are inherently variable in their physical and chemical characteristics. Usually, the variability is much greater vertically than horizontally, resulting from the soil variability in the process that originally formed the soils. The soil variability, in turn, will result in variability in the distribution of water and contaminants and in the ease with which contaminants can be transported within, and removed from, the soil at a particular site. (EPA 1994.)

EPA disagrees with the commenter, however, that such soil physical-chemical variability is lacking in the soil data base. As shown in Chapter 4 and supporting Appendices of EPA

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[43]Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

1998a, the soil data base adequately describe the treatment of various soil textures ranging from difficult-to-treat clays/silts to coarse/sands. Soil texture/particle size distribution is among one of the most important soil characteristics to know because this soil characteristic parameter may be used to screen the applicability of certain remediation technologies. In other instances, particle size distribution enable the identification of adequate pre-treatment steps or specialty/ancillary equipment that enable the contaminants to be treated by an appropriate non-combustion treatment technology.

The soil data base also include some data points describing the treatment of oily/acidic petroleum-sludges. These particular streams can mimic the treatment of soils that have clay/silts as the dominant soil texture. Further, the soil data base show the effectiveness of various technologies in treating difficult-to-treat soil textures and difficult-to-treat constituents such as PNAs (4 and 5 more rings), dioxin and furans, and creosote admixtures. There are other instances were the technology may be inappropriate for one or two clusters of organic or metal groups and such constituent clusters may require further treatment by another appropriate technology.

Corroborative data in the 1995 and 1997 Superfund studies[44] also show that soil variability can be managed by optimized ex-situ full-scale treatment processes. For instance, these Superfund 1995 and 1997 studies document the following approaches to treatment optimization:

1. Soil homogenization[45] - involves the use of ex-situ physical/chemical (p/c) processes to reduce soil heterogeneities that may inhibit treatment performance. P/C processes can be used to screen and segregate fines from large soil fractions, to mix soils with less contaminated/clean soils such that soil malleability can be improved, or to treat other dominant soil physical/chemical characteristic in order to facilitate or to enhance treatment.

Another technique is the selective excavation of soils. This technique involves the combined use of visual inspections, adequate site characterization data on soil texture variability and contaminant distribution, historical site management practices, and field sampling testing

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[44] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

[45] See description of soil screening and separation processes that enable the treatment of difficult-to-treat clay/silty soils via bioremediation and the soil washing of sludge/soil bands; respectively, in the following Superfund 1995/1997 full-scale ex-situ treatability studies: (1) Slurry Phase Bioremediation at the Southern Wood Preserving Superfund Site, Canton, Mississippi , in p. 83, EPA 1997b and (2) Soil Washing at the King of Prussia Technical Corporation Superfund Site, Winslow Township, New Jersey, in p.36 through 38 of EPA 1995b.

equipment/protocols in order to screen vertical soil bands or horizontal soil that can be selectively excavated to undergo treatment. This other technique is routine to the excavation and remediation of hazardous soils.[46]

2. Technology design - involves an understanding of the contaminants in the soil, soil properties that can inhibit treatment, the extrapolation of empirical data from feasibility pilot-/bench-scale studies to full-scale operations. The extrapolation of empirical data also involves the exercise of sound engineering judgments with regard to soil/contaminant characteristics that can cause material handling problems, identification of ancillary or specialty equipment units that can be installed to lessen such material handling problems, and designing the right sequence these equipment ought to be installed and operated.

3. Technology operation - involves various trial and error steps that operators follow in scoping the operational parameters that can be sustained to harness the capabilities of the technology to treat the contaminated soils and thus, meet the technology pre-designed treatment objectives. For instance, operators may identify key recalcitrant or difficult-to-treat hazardous constituents to monitor for and then, optimize operational parameters that enhance the removal or destruction of such contaminants. For example, the operator may operate the treatment process at a higher temperatures, an optimum pH range, a greater ratio amount of reagent-to-contaminant, or at the upper range of the technology designed treatment range provide for longer residence time.

In conclusion, EPA believes that the concerns expressed by the commenters are adequately addressed. The corroborative data show that many of the issues raised by the commenters can be adequately addressed within the context of treatability feasibility studies which are an integral part of soil remediation activities under both RCRA and CERCLA programs. Further, the treatment performance of ex-situ full scale operations (bioremediation, thermal desorption, and soil washing) in the 1995 and 1997 Superfund studies are congruent with the treatment performance that these technologies achieved for similar difficult-to-treat hazardous constituents and harder-to treat soils in the soil data base described in EPA 1998a.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as

[46] For example, see the selective soil excavation technique described in the corroborative full-scale Superfund study titled: Soil Washing at the King of Prussia Technical Corporation Superfund Site, Winslow Township, New Jersey, in p.35 & 36 of EPA 1995a.

Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1993c, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume A: Universal Standards for Nonwastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1993d, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- "**EPA SHOULD ESTABLISH SOIL TREATMENT GOALS ON A RISK, NOT TECHNOLOGY BASIS**

  EPA has expressed a desire to move towards a more risk based regulatory approach. We fully support such an approach, and believe the establishment of soil treatment goals in the HWIR context provides an opportunity to do so. As the Agency is aware, contaminated soils and other remediation wastes are very different from as generate waste, and are typically managed under intense regulatory scrutiny. This is an environment in which a flexible risk based approach is clearly appropriate, allowing for full oversight and involvement of regulatory agencies and the local community in the process to ensure robust decision making.

Technology based LDRs have played a valuable role in driving waste minimization for as generated wastes. In remediation, however, the goal is "waste maximization;" to manage and remediate more, not less, waste. Technology based treatment goals for remediation wastes (the current LDRs) have presented significant impediments and disincentives to remediation. LDR-like technology based standards for soil and other remediation wastes present the risk of simply perpetuating these impediments, thus providing limited regulatory relief.

DuPont and other industry parties have been and continue to be willing to discuss technology based treatment standards in the context of HWIR as part of a larger negotiated agreement (which include appropriately limiting mandatory treatment to the small percentage of highly contaminated remediation wastes). However, we continue to believe that flexible risk based treatment standards for remediation wastes would provide the most appropriate, workable approach.

IF TECHNOLOGY BASED, REMEDIATION WASTE TREATMENT STANDARDS SHOULD BE BASED ON THE FULL RANGE OF REMEDIAL TECHNOLOGIES

In the soil LDR proposal EPA essentially established incineration based treatment standards and modified them slightly to derive standards for soils, ostensibly to ensure that innovative soil treatment technologies would be able to meet the standards. The data base to support the ability of these innovative technologies to achieve the suggested treatment goals (such as 90% removal or the Universal Treatment Standards times 10) is extremely limited, and we do not believe it supports such standards. If, under HWIR, EPA chooses to establish treatment standards based upon technology, such standards should be based upon the performance of proven, available innovative remediation technologies, not upon incineration, to ensure that the full range of effective innovative treatment technologies are employed. To set treatment standards for hazardous soil that limit applicable technologies to incineration would be both contrary to EPA policy and to progress in remediation programs.

We note with some concern that EPA has made several unsupported assertions in the proposed rule to the effect that most hazardous soils are contaminated at "low" and "medium" levels, and that combustion is the most appropriate technology for many highly contaminated hazardous soils. No data is provided to support this assertion. In fact, many innovative technologies can treat highly contaminated soils and remediation wastes. We encourage the Agency to avoid unsupported pronouncements about the role of incineration that appear to be at odds with their stated combustion strategy.

EPA'S CURRENT SOIL TREATABILITY DATABASE IS INSUFFICIENT TO SET TECHNOLOGY BASED STANDARDS

The emergence and application of innovative remedial technologies is relatively recent. As such, there is relatively little data available on their performance, particularly at full scale. However, there is a marked growth in the availability of such data, as increasing numbers of pilot and full scale applications of such technologies occur. EPA's current Soil Treatability Database (STD) reflects the state of technology development in the late 1980's and early 1990's. It contains a limited, small scale data set which does not provide EPA sufficient data to establish valid technology based treatment standards. Significantly more innovative technology performance data will become available in the next few years judging by the projections of EPA's Technology Innovation Office and DuPont's own activities. The regulation of soils and other remediation wastes should take advantage of this trend towards greater volumes and quality of data. Under HWIR EPA should develop a regulatory regime that encourages the use of innovative treatment technologies by ensuring reasonable treatment goals which can both be achieved by these technologies and will protect human health and the environment. The establishment of unrealistically stringent treatment goals would serve to inhibit the development and application of innovative technologies. Establishing treatment goals as specified technologies for certain contaminant classes and soil types would serve to drive the development and use of innovative technologies and provide more and better performance data.

In the capacity evaluation and the RIA of the proposed soil LDR rule EPA makes clear its ambivalence on whether innovative technologies can really achieve the proposed LDR standards. We concur with this concern." (DuPont, CS2P-L0003)

Response: Risk vis a vis technology based treatment standards. All land disposal restriction treatment standards must satisfy the requirements of RCRA section 3004(m) by specifying levels or methods of treatment that "substantially diminish the toxicity of the waste or substantially reduce the likelihood of migration of hazardous constituents from that waste so that short-term and long-term threats to human health and the environment are minimized." As EPA has discussed many times, the RCRA Section 3004(m) requirements may be satisfied by either technology-based standards or risk-based standards. This conclusion was upheld in *Hazardous Waste Treatment Council v. EPA*, 886 F.2d 355, 362-64 (D.C. Cir. 1989), where technology-based LDR treatment standards were upheld as a permissible means of implementing RCRA Section 3004(m) provided they did not require treatment beyond the point at which threats to human health and the environment are minimized. Today's treatment standards for contaminated soils are primarily technology-based; however, a variance from the technology-based standards is allowed when EPA or an authorized state makes a site-specific determination that threats posed by land disposal of the soils are minimized at higher concentrations.

EPA has long indicated that its preference would be to establish a complete set of risk-based land disposal treatment standards at levels that minimize short and long-term threats to human health and the environment. See, for example, 55 FR at 6641 (Feb. 26, 1990). However, the difficulties involved in establishing risk-based standards on a nationwide basis are formidable due in large part to the wide variety of site-specific physical and chemical compositions encountered in the field and the uncertainties involved in evaluating long-term threats posed by land disposal. Id.; 60 FR 66380 - 66081 (Dec. 21, 1995). For these reasons the Agency has chosen to establish land disposal restriction treatment standards based on the performance of specific treatment technologies. Although technology-based treatment standards are permissible, they may not be established at levels more stringent than those necessary to minimize short and long-term threats to human health and the environment. *Hazardous Waste Treatment Council*, 886 F. 2d at 362 (land disposal restriction treatment standards may not be established, "beyond the point at which there is not a "threat" to human health or the environment").

While using risk-based approaches to determine when threats are minimized on a national basis has proven extremely difficult, these difficulties will diminish when evaluating risks posed by a specific contaminated soil in a particular remediation setting since, during remediation, one typically has detailed site-specific information on constituents of concern, potential human and environmental receptors, and potential routes of exposure. For this reason, EPA is establishing a site-specific variance from the technology-based soil treatment standards, which can be used when treatment to concentrations of hazardous constituents greater (i.e. higher) than those specified in the soil treatment standards minimizes short- and long-term threats to human health and the environment. In this way, on a case-by-case basis, risk-based LDR treatment standards approved through a variance process could supersede the technology-based soil treatment standards. This approach was first discussed in the September 14, 1993 proposal, where EPA proposed that determinations that contaminated soil did not or no longer contained hazardous waste could supersede LDR treatment standards, if the "contained-in" level also constituted a "minimized threat" level. It was repeated in the April 29, 1996 proposal where the Agency proposed that, in certain circumstances, variances from land disposal restriction treatment standards could be approved in situations where concentrations higher then the treatment standards minimized threats.[47] 58 FR 48128 (September 14, 1993) and 61 FR 18811 and 18812 (April 29, 1996).

<u>Should technology based treatment standards be achieved by all non-combustion technologies?</u>

Although it is the goal of EPA to establish treatment standards that allow greater use of non-combustion technologies to further the goal of remediations involving treatment of contaminated soil, EPA is not persuaded by the argument that treatment standards ought to be more lenient than the limits established today. RCRA 3004(m) does not compel EPA to establish treatment levels that are achievable by all or many technologies, the statute directs EPA to establish treatment levels that substantially reduce the mobility or toxicity of hazardous constituents prior to disposal such that the short- and long-term threats to human health and the environment are minimized. Basing standards on performance of non-combustion technologies which do not treat effectively simply is not a valid way to implement the statutory mandate.

[47] In the April 29, 1996 proposal, the Agency proposed to limit variances based on a site-specific minimize threat determination to contaminated soils where all concentrations of hazardous constituents were below a "bright line," that is, below a 10-3 risk level. The Agency also requested comment on extending site-specific minimize threat variances to other contaminated soils. Based on further consideration and consideration of comments, the Agency is persuaded that a site-specific minimize threat variance should be available to all contaminated soils. The Agency believes this is proper because the outcome of a site-specific, risk-based minimize threat variance -- alternative, site-specific LDR treatment standards based on risk -- will be the same regardless of the initial concentrations of hazardous constituents. In any case, the Agency is not, at this time, taking action on the portion of the April 29, 1996 proposal that would have established a "bright line" to distinguish between higher- and lower-risk media. If, in the future, the Agency takes action to establish a bright line, it will address the relationship of a bright line to site-specific minimize threat variances.

EPA believes that by requiring a 90 % reduction or 10 times the UTS treatment limits in the 40 CFR §268.48, the requirements of 3004(m) are met. Although EPA agrees with most commenters that risk based limits are also valid constructs of 3004(m), and provided that such limits can be established with the requisite certainty that threats to human health and the environment are minimized, EPA believes that technology based limits are also appropriate to regulate the disposal of soils contaminated with hazardous wastes since such standards provide an objective measure of determining that threats are indeed being reduced (normally to the limit of a technology reasonably applied to the waste) so as to substantially reduce hazardous constituent mobility or concentration.[48] EPA has long indicated that its preference would be to establish a complete set of risk-based land disposal treatment standards at levels that minimize short and long-term threats to human health and the environment. However, the difficulties involved in establishing risk-based standards on a nationwide basis are formidable due in large part to the wide variety of site-specific physical and chemical compositions encountered in the field and the uncertainties involved in evaluating long-term threats posed by land disposal.

<u>The soil treatability data base is sufficient to establish treatment standards.</u>
EPA disagrees with the commenter that non-combustion (i.e., "innovative") technologies considered by EPA cannot support the establishment of treatment standards. Nor is EPA persuaded by the proposed approach that an interim teasing program shall be established until more full-scale operations are in place. Although EPA lacks treatment data describing the full-scale operation of soil washing and vitrification, EPA believes that these technologies can meet the treatment standards. (EPA1998a, EPA 1998d, EPA 1997b, EPA 1995a, and EPA 1995b, and EPA 1994.) Corroborative data also demonstrate that full-scale operation of soil washing and vitrification processes can meet the treatment standards for hazardous soils. (EPA 1995a (soil washing), EPA 1995b (soil washing), and EPA 1997b (vitrification).

EPA concurs with the commenter that it is desirable to have larger sample sizes, generally, when conducting feasibility studies as well as larger pools of full-scale studies. EPA points out that there are full-scale data for biotreatment processes (five studies), chemical dechlorination (one study), stabilization (three studies), steam stripping (four studies), and thermal desorption (six studies) in the soil data base. (See Appendix D in EPA 1998a.) The bench- and pilot- scale data for these full-scale processes in the soil data base further corroborate the feasibility for transferring the proposed treatment standards. However, EPA has found that regardless of the sample size being examined, the extrapolation of bench-/pilot-scale data to the scaling of full-scale operations is often an empirical and site specific process that require the exercise of good engineering judgement and the conduction of trial and error operations. Other consulted treatability studies (EPA

[48] Under today's rule, EPA is setting technology based limits under Section 3004 (m) of RCRA. Note that CERCLA, section 121 , as amended by SARA, P.L. 1986, expresses a preference for remedies that provide a permanent solution and alternative treatment technologies to the maximum extent possible.

1998a, EPA 1988d, EPA 1994) show that full-scale ex-situ processes;[49] such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a.) EPA has also found that the treatment performance ranges attained by the treatability studies in the soil data base meet are congruent with those reported in other consulted literature including literature that describe full-scale operations. (See Chapter 3 in EPA1998a, cited references in EPA 1998d, and ex-situ treatment studies in 1995 and 1997 Superfund treatability studies,[50] and other literature cited below.) Further, the soil data base describe the treatment of difficult-to-treat soil textures and difficult-to treat admixtures of hazardous constituents/multiple contaminants (see Appendix D in EPA 1998a and EPA 1998d). In all cases, at least some of the data shows that the soil standards have been achieved on difficult-to-treat matrices or soils contaminated with hard-to-treat constituents using full scale treatment. Based on these findings, EPA is proceeding with the proposed treatment standards for hazardous soils.

In evaluating what paired data points were suitable as a basis for the Phase IV hazardous soil treatment standards, EPA did examine for possible bias in the consulted studies and rejected data points that resulted from bench-/pilot- scale data and operational practices that result from atypically designed and operated full-scale operations. For example, the Data Summary Form (DSF) Number 76 A, biotreatment, was rejected because the treatment batch test involved a bed that was tilled daily and continuously aerated. Clearly, DSF Number 76 is an atypical practice of full scale biotreatment process operation. A full scale operation may involve, instead, the aeration of soils twice a week. See Chapter 5 of the BDAT Background Document for Hazardous Soil, August 1993, for a discussion of the criteria EPA adopted for the review and evaluation of the available data in this docket. Also, see EPA's findings on these data review and evaluation can be found in administrative record. (EPA 1993a.)

Other consulted treatability studies/literature (EPA 1998a, EPA 1988d, EPA 1994) show that ex-situ processes[51]; such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment

[49] Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

[50] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

[51] Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

objectives. (EPA1998d, EPA 1998a) Based on these findings, EPA is not persuaded by the commenter's recommendation that the proposed mass based thresholds are adopted for the purpose of analyzing what available treatment data may be suitable for rulemaking.

In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

Also, EPA is not persuaded by the arguments emphasizing that "innovative technologies," (i.e., non-combustion technologies) identified by EPA are still in their infancy. There is a wealth information describing the field experience drawn from the operation of non-combustion technologies that span over the past nine to thirteen years.[52] In fact, engineering feasibility studies are an integral part of remediation activities that facilitates the reduction of uncertainties with regard to the feasability of designing full-scale operations of one, two, or more non-combustion treatment trains that are capable of meeting the treatment standards established today. For instance, a wealth of literature has been published on the operation, design, and field implementation of these non-combustion technologies (EPA 1998d and the Administrative Record for Best Management Practices); and many universities teach courses today on the operation and design of soil remediation technologies. Clearly, the availability of know-how is an instrumental asset for facilities to reduce uncertainties with the design, operation, and implementation of noncombustion technology trains. Adequate site characterization of contaminants, soil texture distributions (profiles), and other soil characteristics can enable the use of sound engineering principles and process engineering to advert or manage potential soil matrix interferences and thus, meet the treatment objectives set by today's standards. (EPA1998d, see Chapter 2 in EPA 1994, and 1995 and 1997 Superfund remediation studies of full-scale ex-situ processes.)

■ "B. Treatability Data Request

1. General Comments

In its preamble discussion at page 48,130, EPA requested additional data with regard to the treatment of hazardous soils. At the outset, the Project notes that the greatest shortcoming in the soil BDAT proposal is the limited database currently available on the performance of innovative technologies. The analysis of the database and the methodology underlying development of the proposed BDAT treatment standards suggests that few, if any, innovative technologies could consistently meet the proposed standards in the real world, so that current thermal technologies would predominate. However, the Project does provide the following comments with regard to utilizing certain treatability data to predict the effectiveness of treatment technologies in real-world

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[52] See pages 9 through 21 document titled: Innovative Treatment Technologies Annual Status Report (eight Edition), November 1996, EPA, Washington, DC 20460. (EPA 542-R-96-010.)

situations.

2. Treatability Test Methods

The Project members are particularly concerned that 85% of the information in the Agency's treatability data base is derived from bench-scale studies. The data provided on this issue by the Project membership confirm that performance obtained in bench-scale testing is seldom achieved in full-scale field operations. For example, one member reports that the shortfall is frequently such that actual reductions are in the 60%-70% range, notwithstanding much more optimistic projections from laboratory scale work. Another member reports significant variation even in bench-scale results, with removals varying from as little as 7% to as much as essentially 100%. One member reports bench-scale results for a bioremediation process that show chlorinated PAH reductions from 9% to 90+% over an initial concentration range of approximately 3,000 mg/kg to 7, 000 mg/kg. Conversely, a bench-scale soil solvent washing process yielded better than 99% removal of aromatic VOCs over an initial concentration range from approximately 50 to 2, 000 mg/kg.

It is clear from the information provided by the RCAP member companies that most of the data reported in the literature regarding performance of treatment technologies are vendor-generated bench-scale data not likely to be representative of actual field applications for several reasons: 1) vendor data often represent the best results for individual constituents from numerous tests, rather than from contemporaneous performance on all constituents in the matrix; 2) bench-scale tests often employ equipment very unlike that which would be used in full-scale applications; and 3) there is an inevitable degradation in performance when moving from carefully controlled lab tests on small matrix samples to less controllable full-scale field applications addressing the heterogenous materials typically managed in a remediation project. Many of these deficiencies appear to be present in the database EPA is using in developing the soil BDAT rule as well, as set forth in Exhibit D to these comments.

For example, the 90% reduction alternative in the proposal is probably unachievable in the real world in most instances and could freeze out innovative technologies. Furthermore, the Project members note with alarm that EPA seems to be endorsing the 90% reduction concept in the HWIR discussions for contaminated media, notwithstanding our cautions that this course of action is highly counterproductive to the development and use of innovative technologies. See Exhibit C, August 19, 1993 Letter to Devereaux Barnes, Director, Permits and State Programs Division, EPA Office of Solid Waste from Lowell F. Martin, Counsel to the RCRA Corrective Action Project re: RCRA Corrective Action Project Member Data on "Bright Line" Criteria and Treatability.

These many variables and the paucity of validated, full-scale data suggest that in the development of treatment goals for hazardous soils, EPA should start fresh by examining the available data on a multiple-constituent basis and then assuring adequate consideration of factors such as projecting to full-scale performance from bench-scale data and taking account of matrix variability. The Project members recognize that we are not providing significant quantitative data on the above-described issues. We believe, however, that the reality that a supportable database is not available on key technical issues warrants a different approach, as set forth below, as EPA proceeds with rulemaking in this area.

The Project proposes that EPA use the HWIR process for contaminated media as a means for developing a high-quality database on innovative technologies. In particular, the Project encourages the Agency to 1) specify that exhumed hazardous waste material above HWIR "bright line" concentrations be treated by designated technologies with specified best management practices during a 3-5 year interim period, and 2) standardize treatability studies and performance data collection requirements to build a database on innovative technology performance during that interim period. At the same time, EPA could use the enhanced database (after the close of the 3-5 year interim period) to establish treatment levels for remediation wastes based on innovative technologies, if appropriate. We note hopefully that much more innovative technology performance data appears likely to become available in the next few years, especially if our proposal for using HWIR to this end is adopted." (RCRA Corrective Action Project, CS2P-00164)

Response: EPA concurs with the commenter that it is desirable to have larger sample sizes, generally, when conducting feasibility studies. Also, EPA points out that there are full-scale data for biotreatment processes (five studies), chemical dechlorination (one study), stabilization (three studies), steam stripping (four studies), and thermal desorption (six studies) in the soil data base. (See Appendix D in EPA 1998a.) The bench- and pilot- scale data for these full-scale processes in the soil data base further corroborate the feasibility for transferring the proposed treatment standards. However, EPA has found that regardless of the sample size being examined, the extrapolation of bench-/pilot-scale data to the scaling of full-scale operations is often an empirical and site specific process that require the exercise of good engineering judgement and the conduction of trial and error operations. Other consulted treatability studies (EPA 1998a, EPA 1988d, EPA 1994) show that full-scale ex-situ processes;[53] such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a.) EPA has also found that the treatment performance ranges attained by the treatability studies in the soil data base meet are congruent with those reported in other consulted literature including literature that describe full-scale operations. (See Chapter 3 in EPA1998a, cited references in EPA 1998d, and ex-situ treatment studies in 1995 and 1997 Superfund treatability studies,[54] and other literature cited below.) Further, the soil data base describe the treatment of difficult-to-treat soil textures and difficult-to treat admixtures of hazardous constituents/multiple-contaminants (see Appendix D in EPA 1998a and EPA 1998d). In

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[53]Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

[54] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

all cases, at least some of the data shows that the soil standards have been achieved on difficult-to-treat matrices or soils contaminated with hard-to-treat constituents using full scale treatment. Based on these findings, EPA is proceeding with the proposed treatment standards for hazardous soils.

In evaluating what paired data points were suitable as a basis for the Phase IV hazardous soil treatment standards, EPA did examine for possible bias in the consulted studies and rejected data points that resulted from operational practices that result from atypically designed and operated full-scale operations. For example, the Data Summary Form (DSF) Number 76 A, biotreatment, was rejected because the treatment batch test involved a bed that was tilled daily and continuously aerated. Clearly, DSF Number 76 A is an atypical practice of full scale biotreatment process operation. A full scale operation may involve, instead, the aeration of soils twice a week. See Chapter 5 of the BDAT Background Document for Hazardous Soil, August 1993, for a discussion of the criteria EPA adopted for the review and evaluation of the available data in this docket. Also, see EPA's findings on these data review and evaluation can be found in administrative record. For example, see EPA 1993a.

Other consulted treatability studies/literature (EPA 1998a, EPA 1988d, EPA 1994) show that ex-situ processes[55]; such as those supporting the treatment standards being promulgated today, can be engineered and optimized to meet a pre-determined regime of treatment objectives. (EPA1998d, EPA 1998a) Based on these findings, EPA is not persuaded by the commenter's recommendation that the proposed mass based thresholds are adopted for the purpose of analyzing what available treatment data may be suitable for rulemaking.

In this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

EPA disagrees with the commenter that non-combustion (i.e., "innovative") technologies considered by EPA cannot support the establishment of treatment standards. Nor is EPA persuaded by the proposed approach that an interim teasing program shall be established until more full-scale operations are in place. (EPA1998a, EPA 1998d, EPA 1995, and EPA 1994.) Corroborative data also demonstrate that full-scale operation of soil washing and vitrification processes can meet the treatment standards for hazardous soils. (EPA 1995a (soil washing), EPA 1995b (soil washing), and EPA 1997b (vitrification). However, if a soil treatment standard proves unachievable for a particular soil matrix using one of the technologies on which the standard is based, and that the technology or appropriate technology train is properly designed and operated, then a treatment variance could be issued under the unachievable prong of the 40 CFR § 268.44 (h). There is no

[55]Namely, technologies such as chemical dehalogenation, air/steam stripping, biotreatment, thermal desorption, chemical/solvent extraction, and soil washing.

requirement that the soil be treated by combustion to achieve the treatment standard.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

5.F.4 Bioremediation

- "RETEC does not agree with EPA's contention that "Analysis of the available soil treatability data has revealed that innovative technologies (e.g., thermal desorption, biological treatment, dechlorination) can generally achieve the universal treatment standards proposed today." Section 4 of our comments provides information to support our position that bioremediation can not achieve the hazardous soil standards identified in the proposed rule. " (RETEC, CS2P-00026)

Response: The commenter believes that EPA's proposed treatment standards for hazardous soils have not yet been demonstrated for any soils in practice.

EPA disagrees with this comment.

First, the treatment data supporting the proposed rule clearly show and support EPA's determination that several non-combustion technologies can meet the proposed limits for organic and metal constituents found in hazardous soils, or 10 x UTS levels, or the 90% reduction in the total or leachable concentration of hazardous constituents present in hazardous soils. (See preamble in Phase IV final rule; EPA 1998a; EPA 1998 b; EPA 1998c; and EPA 1998d). For instance, EPA collected over 6,000 paired data points describing the treatment of various hazardous soils. In response to an outgrowth of the comments, EPA has retained 2,143 paired non-combustion data points to set today's treatment standards. EPA believes that these 2,143 paired non-combustion data points are reasonably sufficient to adequately describe the treatment of metal, organics, and multiple metal and organic contaminants that are frequently found at different type of sites, including both Superfund and RCRA sites. (EPA1998a, EPA 1998b, EPA 1998c, EPA 1998d, and EPA 1994.) For example, the SDB has treatment data on soils with varying textures including top soils, silty/loam soils, and clay soils. (EPA 1998a) Furthermore, EPA has a number of bench and pilot studies on the treatment of contaminated soils from wood preserving, petroleum refining, and electroplating sites, which contain a wide range of constituents such as polynuclear aromatic, phenolic, chlorinated organics, spent solvents, creosote, and metals. (EPA 1998a) These constituents are found at other RCRA and Superfund sites. (EPA 1993a)

Second, full-scale data on non-combustion technologies, published in 1995 and 1997, show that ex-situ chemical and energy intensive remediation technologies applied to Superfund sites can be engineered and optimized, generally, to meet pre-designed remediation treatment objectives. In many instances, ex-situ processes were able to meet a 90 % reduction of hazardous constituents in soils or the 10 times UTS limit. (EPA 1998a) EPA refers to these data as the Superfund full scale 1995 and 1997 data studies.[56]

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[56] These data consist of many full -scale treatment studies conducted at Superfund sites. Many of the ex-situ remediation studies met the soil treatment objectives sought by their Record of Decision. Such treatment objective, in many instances, also met the proposed treatment limit of 10 times UTS for soils or the 90 % reduction in the concentration of hazardous contaminants prior to disposal. See 1997 studies: (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007. See 1995 studies: (1) Abstracts of Remediation Case Studies, EPA-542-R-95-001, March 1995; (2) Remedia-tion Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995; (3) Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937, March 1995; (4) Remediation Case Studies: Bio remediation, EPA-542-R-95-002 or NTIS: PB95-182911, March 1995; and (5) Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929, March 1995.

Third, other pilot- and full-scale data supporting the development of Superfund Presumptive Remedy guidance documents for wood preserving sites also support EPA's proposed treatment standards. In particular, thermal desorption was able to attain concentrations and concentration reduction levels meeting the treatment limits established by this rule. (EPA 1993b, EPA 1995a, and EPA 1997a.)

This is an expected result since ex-situ soil remediation technologies such as stabilization, soil washing, dechlorination, and chemical extraction are more amenable to optimization. (EPA 1994) One way to optimize these technologies is to rely on physical and chemical technologies that enable the chemical/physical treatment of soil properties or the homogenization of soils. (EPA 1998d, EPA 1994).

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

- "Bioremediation has demonstrated its success in protecting human health and the environment at many Superfund and RCRA sites. Therefore we are pleased by EPA's desire to encourage the use of alternative treatment technologies to establish treatment standards for hazardous soils.

  However, it appears that the hazardous soil treatment standards proposed will limit the future use of bioremediation at many sites. An explanation of some of the constraints of bioremediation may prove helpful in modifying the proposed land disposal restriction program to achieve all of EPA's goals and objectives." (RETEC, CS2P-00026) **GREEN TAB**

Response: With regard to the treatment performance of biological treatment processes, the soil data base shows that this technology is among the most soil and constituent specific treatment technologies available for the treatment of hazardous soils. The technology will perform best in many compounds that are water soluble, amenable to volatilization, and amenable to co-metabolization. (EPA 1993a, EPA 1998a, EPA 1998c, and cited academic literature in EPA 1998d.) For instance, many soluble and slightly soluble compounds can be treated to the regime of concentrations established today. The soil data base also shows that Pentachlorophenols and less soluble Polyaromatic hydrocarbons such as PNA's with four or more rings are resistant or recalcitrant to biodegradation processes. The data discussed above also show that threshold concentrations of chlorinated pesticides may inhibit the bioremediation of chlorinated pesticides. PCPs and four to five ring PNAs biodegrade at much slower rates or attain an average treatment performance reduction range from 35 % to 70% which falls short from the 90% treatment regime established today. These recalcitrant constituents may require additional treatment by another technology train such as chemical dechlorination (PCP and chlorinated organics), solvent extraction (PNAs, PCP, and chlorinated pesticides), and thermal desorption (PNAs, PCP, and chlorinated pesticides). EPA's findings with regard to the performance of bioremediation treatment processes (EPA 1993, EPA 1998a, and EPA 1998b) are quite congruent with other bench-, pilot-, and full-scale operation of bioremediation processes (EPA1998a, EPA 1998d, HWTC 1993, and EPA 1994).

EPA has determined, therefore, that the biotreatment performance data in the soil data base is viable for rulemaking for a limited set of hazardous contaminants. The treatment performance of bioremediation processes becomes inferior for insoluble compounds and heavily chlorinated organics. As a result, the technology may be inappropriate for some of these recalcitrant constituents.

Although EPA prefers, generally, to rely on full scale studies for the purpose of developing and promulgating treatment standards, and this is true with respect to the soil treatment standards as well. However, in this case as well as in many prior LDR treatment standard efforts, EPA's data base includes more than just full scale data upon which EPA can properly rely. Bench and pilot scale technologies can be appropriately considered by EPA (and EPA has historically done so) in setting treatment limits as long as full scale operations of the treatment system under consideration exist or have been demonstrated on wastes/soils.

Furthermore, in this rulemaking, given the variability of hazardous soils (in terms of soil textures, concentrations and numbers of hazardous constituents and soil matrices), plus the special considerations of facilitating treatment during remediations, the Agency is adopting treatment standards from the zone of reasonable values which could be permissibly selected based upon the performance data. Thus, the data are not being used so much to establish a precise performance level as to confirm the typical achievability of the promulgated standards, i.e., ten times UTS or 90% reduction.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460. (**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

- "Under section 3004(m) of HSWA, EPA is mandated to identify the Best Demonstrated Available Technologies to be used prior to land disposal. The legislation does not prescribe on what basis EPA must make this determination. RETEC proposes that EPA use bioavailability as the measure of treatment efficiency. Bioavailability would be measured as leachable extract. When bioremediation performance is compared to the performance of incineration to remove the leachable constituents, both technologies are equal. Both incineration and bioremediation remove more than 99% of the leachable contaminants." (RETEC, CS2P-00026)

Response: EPA is not persuaded by this comment.

The TCLP test method is an inappropriate performance indicator for the removal or destruction of hazardous organics. The legislative history to section 3004(m) -- in particularly Senator Chaffee's floor statements-- makes it clear that hazardous organic constituents are typically to be destroyed. This issue was settled in the Phase II final rule. See Response to Comments Document with regard to treatment standards applicable to PNAs in petroleum sludges.

- "EPA has historically expressed serious concern for basing treatment standards for organics on stabilization technology. Leachable extract standards could obviously be achieved with bioremediation. In addition leachable extract standards could be achieved by stabilization technologies. EPA has expressed concern about stabilization as a treatment technology. EPA maintains that stabilization has not been demonstrated to be effective in containing organics for extended periods of time.

  This problem could be resolved by combining a treatment requirement that would incorporate a reduction in leachable extract <u>and</u> total constituent analysis. One possible approach would be to promulgate a rule with a leachable extract treatment option that would mandate a 95% reduction in leachable extract and a 40% reduction in total constituent analysis. This insures that significant treatment had occurred and that the material had not only been stabilized. Stabilization technologies could not achieve the combination treatment standard for both bioavailable and constituent analysis." (RETEC, CS2P-00026)

Response: This issue is moot since EPA is not setting treatment standards for organics that are based on the treatment performance of chemical stabilization/solidification technologies. Although EPA may allow the chemical stabilization of organics, under very limited circumstances in a treatment variance context (which circumstances are not altogether clear would be highly fact dependent), the current policy apply to chemically stabilized/solidified soils contaminated with organics still require the measurement of organics by total constituent analysis, as measured by methylene leachate extracts or other appropriate solvents. ** EPA notes, however, that it is permissible to drive off organics during the stabilization process if the organics are captured and properly treated. For example, by using stabilization which are equipped and comply with 40 CFR § 264 (or 265) Subpart CC air emission controls.

- "Leachable extract tests require more expensive analytical tests.

  RETEC's proposal does not mandate the use of the leachable extract tests. The total constituent analysis approach using the universal treatment standards would still be available to the regulated community." (RETEC, CS2P-00026)

Response: EPA proposed treatment standards for hazardous organics are expressed in mg/kg (as measured by total constituent analysis) based on the treatment performance of bioremediation, chemical/solvent extraction, thermal desorption, and steam/air stripping. EPA is promulgating these treatment standards.

- **GREEN TAB** (CS2P-00026.C)

5.F.5 Solidification/Stabilization

- "With respect to hazardous soils, Heritage believes the Agency should allow the use of stabilization for treatment of contaminated soil matrices with both organic and inorganic contamination, provided the stabilized soils are disposed of in an MTR (double lined) RCRA Subtitle C permitted unit." (Heritage Environmental Services Inc., CS2P-00103)

Response: EPA reads the comment to say that organics should be treated by stabilization, not removal or destruction. EPA disagrees. Section 3004(m) generally requires destruction of hazardous constituents. See floor statement of Senator Chaffee. Moreover, the suggestion that this normal requirement be mitigated by Subtitle C disposal of residues is misplaced. Treatment which minimizes threats is to occur before land disposal . API, 906 F.2d 726.

To set out in detail to the comment of Chemical Waste Management, however, the rules do not forbid stabilization of wastes containing organic hazardous constituents. If the process drives off organics and properly captures and destroys the volatile emissions, this could be permissible. It is also possibly conceivable that combustion treatment of a waste would be inappropriate under some circumstances, in which case a treatment variance based on stabilization might be justified.

- "I. Stabilization of Organics

  EPA requests comments on whether stabilization is appropriate for hazardous organic constituents in soil. This is yet another example of relaxing BDAT. It has long been the position of both Congress and EPA in developing the LDR Program that organic hazardous constituents must be destroyed or recovered, but not simply stabilized or immobilized and disposed. The HWTC opposes this recent proposal for stabilization of even low level organic contamination in soil, as the intent of the LDR statue is to ensure that hazardous organic constituents are truly treated and not simply diluted." (Hazardous Waste Treatment Council, CS2P-00060)

Response: EPA generally agrees. See response to comment of Chemical Waste Management, Inc.

number PH4P-00048.

- "The HWTC opposes the proposal to allow stabilization of organics, which EPA's own data shows is an oxymoron. Organics must be destroyed, not diluted with "stabilizers" that do not stabilize the organics." (HWTC, CS2P-00060)

Response: EPA agrees that "stabilization" of organics could easily be impermissible dilution. See response to comment of Chemical Waste Management, Inc. number PH4P-00048.

- "On March 15, USPCI submitted comments concerning the referenced proposal. Our comments contained a summary document describing our evaluation of the effectiveness of stabilization to treat organic constituents in petroleum refining wastes. We also indicated that we would provide comprehensive QA/QC data under separate cover. This information is contained in the enclosed volumes.

  As we suggested in our comments, we believe that specialized reagents can be effectively used to properly treat organic constituents in soils and other wastes. The study data provided generally shows substantially reductions in measurable organics can be obtained by such means. It is also our view that organic stabilization is only appropriate when the stabilized waste is then properly disposed in a secure Subtitle C land disposal unit meeting minimum technology requirements." (USPCI, CS2P-L0005)

Response: EPA has addressed this comment in the Phase II proposal. Because the commenter asserted a claim of RCRA Confidential Business Information with regard to the submitted proprietary process, no further discussion of these data is provided here. However, EPA found that the submitted treatment data by USPCI was not sufficient to arrive to a determination that the proposed proprietary chemical stabilization process can be construed as a permissible treatment within the context of RCRA 3004 (m).

■ “Soils are Among the Easiest Wastes to Treat and There is No Need Engage in Arbitrary Relaxation of Standards

True soils are among the easiest wastes to treat using non-combustion methods. USPCI facilities treating soils containing metals have found these soils to be readily susceptible to stabilization using traditional reagent mixes. Treatment failures necessitating re-treatment for metals are rare for soil waste streams. There is no conceivable public-health consideration that would justify relaxed standards for a waste that can readily be treated using the most-accepted and available treatment process. To the extent and “innovative” technology cannot meet the existing treatment standards for soils, we believe that technology is inappropriate.[1] We believe that a technology should either not be used or comprise only an element in a proper treatment train.

USPCI’s experience also indicates that organic constituents in soils at typical low to moderate concentrations are often amenable to destruction by chemical oxidants (e.g. hypochlorite, permanganates) to the meet current treatment standards. USPCI’s operating companies often utilize these methods. Thus, there is no need for to adopt some arbitrary multiplier to ensure that a soil will never fail to meet the standard.” (USPCI, CS2P-00171)

Response: EPA disagrees that hazardous soils are among the easiest streams to treat by stabilization. Treatment data showing that the existing treatment standards may not be attainable by treatment standards established in the 40 CFR §268.48 are provided in Appendix D of EPA 1998a. Also, there are other published literature discussing a wide spectrum of problems that may arise during the stabilization of hazardous soils. See EPA 1993a; EPA 1998a; EPA 1995a; EPA 1994; and EPA 1988.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1995a, July 1995, Contaminants and Remedial Options at Selected Metal-Contaminated Sites, Office of Research and Development, Washington, D. C. (EPA/540/R-95/512 or **NTIS**: **PB95-271961**)

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1988, September 1988, Technology Screening Guide for Treatment of CERCLA Soils and Sludges, Office of Solid Waste and Emergency Response, Washington, D. C. EPA 540/2-88/004.

■ “EPA discusses stabilization as typically not being considered an effective treatment technology for organics.

In the discussion on page 48125 of the FR subject proposed rule, EPA discusses the problems encountered when soil matrices contain metal concentrations of concern while containing very low organic concentrations that are only slightly above the UTS. Westinghouse supports EPA's contention in this discussion that stabilization would be considered effective treatment given this circumstance. Westinghouse also supports this contention for non-soil wastes. As described in earlier comment packages on the Advance Notice of Proposed Rulemaking (ANPRM) for Contaminated Soil and Newly Listed and Identified Wastes and the Interim Final Rule for Ignitable and Corrosive Wastes, Hanford tank wastes can be characterized as just such a matrix. For these wastes, radiological constituents constitute the greatest risk to human health and the environment. The hazards imposed by the organics, from the limited data available, are inconsequential relative to the other hazards. In situations like this, EPA should allow for the use of stabilization as an appropriate treatment technology for the waste matrix as a whole." (Westinghouse Electric Corp., CS2P-00115)

Response: This comment is either too general or too specific (Hanford wastes) to be responded to definitely. It may be that given risks posed by mixed wastes, stabilization might be most appropriate technology. However, if so, a treatability variance is the proper forum to seek to resolve this difficult and highly fact specific question.

- "Treatment of Hazardous Soils by Stabilization Technology Will Not Include Reducing Hazardous Constituent Concentrations to the Levels Proposed by EPA

  Although the discussion of alternate treatment technologies for hazardous soils will be addressed in detail in subsequent comments, EPA's proposed rule raises a threshold concern. EPA notes that TCLP hazardous soils will continue to be managed by stabilization or combustion. EPA further notes that after a Final Rule is promulgated "… facilities must treat the wastes to meet the treatment standard for the TC waste– including standards for any underlying hazardous constituents–prior to land disposal." (58 FR 48114.)

  Where the treatment method is stabilization, technically, no reduction in the amount of toxic constituents occurs, but the waste is less leachable and is, therefore, less toxic. Consequently, the waste still meets the RCRA section 3004(m) standard because treatment by stabilization "substantially reduces the likelihood of migration of hazardous constituents from the waste." EPA must clarify that treatment of TCLP wastes by stabilization technology precludes the necessity of treating the waste to reduce both the hazardous characteristic constituent level and any underlying hazardous constituent concentrations to the levels proposed by EPA." (Demetriou, Del Guergio, Springer & Moyer, CS2P-00129)

Response: See other responses to comment on this issue, in particular, response to Chemical Waste Management, Inc. number PH4P-00048.

5.F.6 Incineration

- "On page 48096, section E, Soil Contaminated with Hazardous Waste, the FR states that , "The numerical treatment standards for many of these hazardous wastes when they are not found in the soil matrix is based on the performance of incineration, a technology not uniformly appropriate for hazardous soil." The U.S EPA begins talking about the origin of the standard (incineration), then says that the technology may or may not be appropriate for hazardous soil then concludes that, "therefore, [the Agency} is proposing these alternative treatment standards for hazardous soil based on performance of technologies more appropriate for soil treatment." There is no cause/effect logic as to whether or when the standard is appropriate, or why or when other technologies are more appropriate. The basis for changing technologies and or standards in the FR argument seems flawed or incomplete." (Association of State and Territorial Solid Waste Management Officials, CS2P-00091)

Response: For soil contaminated with organic constituents, EPA has noted many times that, notwithstanding the fact that such soils can be burned, it is generally unsuitable or impractical from a technical standpoint to burn large volumes of mildly contaminated soil. See, For example, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806-18808 (April 29, 1996). In addition, the Agency has documented potential difficulties that may arise from the combustion of soil due to soil/contaminant characteristics that affect incineration performance such as the concentrations of volatile metals, the presence of alkali salts, fine particles of soils such as clays and silts, and the ash fusion point of the contaminating waste. For example, operation of an incinerator at or near the waste ash fusion temperature can cause melting and agglomeration of inorganic salts; the loading of clays and silts in some soils may also result in high loadings of particulate matter in flue gases. *Proposed BDAT Background Document for Hazardous Soils*, August 1993 and *Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988.

- "With reference to part E, *Soil Treatment Database*, section 3, Analysis of the Database, para. a, *Incineration of innovative technologies*, we feel the Agency is remiss in the "common sense approach" for granting incineration practicality "only for 'hot spots' where soil is highly contaminated with organic constituents." We feel this statement does not go far enough to promote the possibility that technology may exist, for which the Agency has no current data, to effectively and efficiently handle such "hot spots". Incineration should be an "action of last resort", which would be utilized by exception, not by rule. In light of this, preference should be granted to those technologies that are effective in achieving the universal standards and are least threatening to in operation. This would make the best remediation technology the easiest to implement. As new technologies are brought to the forefront, an elimination of relatively harmful remediation technologies such as incineration should follow." (Biogenesis Enterprises Inc., CS2P-00180)

Response: The treatment standards promulgated today for hazardous soils are based on the performance of non-combustion technologies.

Since soil treatment is generally matrix dependent, the exact treatment technology which might be applied to any given contaminated soil will depend on the specific properties of the soil and the hazardous constituents of concern. Choices about which soil treatment technology to apply should be informed by appropriate use of bench and pilot scale studies and good engineering judgement. EPA acknowledges that the treatment efficiency necessary to achieve the soil treatment standards will depend on, among other things, the initial concentrations of hazardous constituents in any given contaminated soil. Thus, not all soil treatment technologies will be capable of treating every contaminated soil to meet the standards adopted in this rule. However, the Agency finds that the standards typically can be achieved by thermal desorption, even in the case of hard-to-treat hazardous constituents such as dioxins and furans, polychlorinated biphenyls, and polynuclear aromatics.

- "Data Relied on by the EPA Suggests That no Departure From Protective Standards is Warranted for Soils and the EPA Should Avoid Undermining the BDAT Methodology by Selecting an Arbitrary Multiplier or Percent Reduction Standard

Although, USPCI does not have substantial data concerning the treatment efficiency of the so-called innovative technologies, we believe that these technologies may in some cases be more efficient than USPCI's chemical processes. If USPCI can meet current treatment levels for a wide range of soils, these other technologies should be able to meet existing standards for a wider range of soils. Moreover, the EPA's own data indicates that no multiplication factor or floating treatment standard is needed to ensure that most soils are treated to meet environmentally protective standards. EPA states directly that "treatability data has revealed that innovative technologies… can generally achieve the universal standards…[1] We are perplexed that, despite this finding, the EPA goes on to argue that the treatment standards are not appropriate and must be relaxed.

In reaching this startling conclusion, the EPA completely inverts the current method for dealing with problematic wastes and constituents. We assume that when the Agency states that "[i]n several cases,…non-combustion does not achieve the universal standards," tie reference reflects treatability data in the EPA's possession tending to show that particular constituent can not be treated to the UTS level using any of the so-called innovative methods.[2] Prior to the Proposal, the Agency's methodology established the minimize threat level as that level providing the greatest achievable degree of environmental protection. To the extent a technology that the EPA considered potentially appropriate as BDAT did not achieve that level of treatment for that constituent, the Agency could follow two paths. First, the Agency could acquire treatability data to determine the actual treatability of the constituent. In the alternative the Agency could set the standard at the protective level and address specific treatability problems through the treatability variance procedures in part 268. We understand that the Agency does not possess sufficient treatability data to determine actual constituent treatability for each "innovative" technology. In fact, we agree with the Agency, that its soil treatment database is incomplete and supports discussion by generalities only.

We disagree, however, that the dearth of data coupled with a few generalized conclusions justifies the proposed sea-change in the EPA's approach to BDAT standard-setting. That sea-change is reflected by the EPA's determination, based on almost no data, that a few constituents which may be difficult to treat in some processes (but not in others?) Provide a basis to abandon the well-established treatability variance methodology for addressing treatability problems. In our view, establishing protective treatment standards and addressing the few treatability problems alluded to by the proposal is far more reasonable than the Proposal methodology. We note that the EPA claims that "innovative technologies" can meet the UTS standards most of the time. Moreover, it is not the case that every soil matrix will contain one of these treatability-impaired constituents. For those soil matrices that do not contain a problem constituent, there is no rational justification for permitting treatment to less than minimize-threat levels. Because the only justification the EPA offers for relaxed standards is the Agency's desire to facilitate use of non-combustion technologies, and because such technologies can, in these cases, meet combustion-based standards, the EPA should continue to require treatment to those levels.

In those few cases where constituent treatability is actually a problem, the EPA should continue to require treatability variances. As the Agency notes throughout the proposal, alternative technologies have application primarily at superfund sites and large corrective action sites. Because these sites are already subject to substantial public participation requirements and because the Agency can grant a non-rulemaking treatability variance using CERCLA resources as part of the compulsory ROD process, there is no reason for the Agency to avoid the process.

Sound policy dictates maintaining the current approach. Stringent, protective public health standards will continue to encourage development of better and more "innovative" technologies. Conversely, applying an arbitrary multiplier to an already achievable standard will freeze development where it is now. After all, what rational businessmen would invest in research and development to progress when a federal agency considers a standard that he can meet easily using technology in hand. In fact, a standard that he can meet easily by downgrading his technology. No rational businessman would undertake such development.

In sum, we believe that if the Agency does not have data sufficient to make specific determinations for innovative technologies, soil standards should remain set by incineration at the levels determined to minimize human health and the environment by application of the best available technology. Difficult to treat constituents in a process can be adequately addressed through part 268.44 variance procedures. This policy will encourage development of more innovative and better performing technologies and will assure that the essential public health and environmental protection goals included in the HSWA are upheld."(USPCI, CS2P-00171)

Response: EPA disagrees with the commenter that EPA lacks sufficient data to make determinations with regard to the performance of non-combustion technologies and that the treatment of multiple-constituents is not addressed by the treatment standard. (See preamble discussion in today's final rule, Section VII. (8); EPA 1998a; and EPA 1998d.)

The need to revise the existing BDAT framework and to establish a separate set of treatment standards are based on the following findings:

With respect to the remedial context, EPA, the states, and the regulated and environmental communities have long recognized that application of the current LDR treatment standards to contaminated soil can be counterproductive. See, for example, "Hazardous Waste: Remediation Waste Requirements Can Increase the Time and Cost of Cleanups" U.S. General Accounting Office, GAO/RCED-98-4, October 1997. Application of current LDRs to contaminated soil often presents remediation project managers with only two choices: pursue a legal option of capping or treating hazardous contaminated soil in place thereby avoiding a duty to comply with LDRs, or excavate the soil and treat it to the full extent of best demonstrated available technology, usually, for organic constituents, incineration. EPA has found that this situation often creates an incentive to select remedies that minimize application of LDRs (e.g., remedies that involve capping or leaving untreated soil in place) a result obviously not contemplated by Congress in enacting the LDR program.[57] 62 FR at page 64505 - 64506 (Dec. 5, 1997) and 61 FR at 18808 (April 29, 1996) and other sources cited therein.

Because of the differences between the remedial context (responding to wastes which have already been released to the environment) and regulation of wastes generated by on-going industrial process (preventing wastes from being released into the environment), EPA has rejected the conclusion that treatment standards for soil must be based upon the performance of the "best" demonstrated available treatment technology in the way the Agency has historically interpreted these terms. Instead, the Agency has chosen to develop soil treatment standards that can be achieved using a variety of treatment technologies which achieve substantial reductions in concentration or mobility of hazardous constituents and are generally applied to contaminated soils in remedial settings. As EPA has long maintained, the strong policy considerations that argue for using BDAT as the basis for LDR treatment standards for hazardous wastes generated by on-going industrial do not apply when evaluating BDAT in the remedial context. In the remedial context, waste minimization is not an issue and the additional increment of treatment necessary to achieve BDAT may yield little if any environmental benefit over other treatment options that adequately protect human health and the environment. 54 FR 41568 (October 19, 1989). Indeed there is a legitimate question whether a technology whose use results in foregoing other, substantial environmental benefits (such as more aggressive, permanent remedies) can be considered a "best" technology. *Portland Cement Association v. Ruckelshaus*, 486 F. 2d 375, 385-86 at n. 42 (D.C. Cir. 1973); *Essex Chemical Corp. v. Ruckelshaus*, 486 F. 2d 427, 439 (D.C. Cir. 1973). This issue was discussed fully in the April 29, 1996 proposal and in a number of other EPA documents, for example, 54 FR 41568 (October 19, 1989) and 61 FR at 18808 (April 29, 1996) and other sources cited therein.

The soil treatment standards promulgated today will significantly improve management of contaminated soil and remediation projects that involve contaminated soil. However, the Agency emphasizes that today's rule does not resolve the larger, more fundamental issues associated with application of RCRA Subtitle C to remediation. The Agency maintains that additional reform is needed to address, more fundamentally, the application of RCRA to all remediation wastes, including contaminated soil. The Agency will continue to participate in discussions of potential legislation to promote this additional needed reform. If legislation is not forthcoming, the Agency may reexamine its approach to remediation waste management, including the soil treatment standards.

[57] As discussed in the April 29, 1996 proposal, EPA has, in the past, justified the existing treatment standards, in part, because they create an incentive to generate less of the affected waste in the first instance. See, *Steel Manufactures Association v. EPA*, 27 F.3d 642, 649 (D.C. Cir. 1994). In the remedial context, the waste is already in existence; therefore waste minimization is not an issue. Thus, application of the current LDR treatment standards to remediation waste can have the perverse effect of creating an incentive to avoid "generating" waste by leaving it in the ground. The Agency believes that the goals of remediation are better served by more aggressive remedial approaches, such as excavation and management (including some degree of treatment) of remediation wastes, that generally result in more permanent remedies. Such approaches should, therefore, be encouraged.

■ “7.0 COMMERCIAL INCINERATION CAPACITY FOR SOILS

This section presents the results of the analysis of available capacity for incineration of soils at the HWTC facilities. Thirteen units reported capacity for soils. Table 7-1 presents the hazardous waste and all waste available capacity for incineration of soils at HWTC facilities. Table 7-2 presents maximum hazardous waste and maximum all waste available capacity for incineration of soils at HWTC facilities.” (Hazardous Waste Treatment Council, CS2P-00060.F)
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Response: The issue of what treatment capacity is available for hazardous soils is moot since the capacity variance period for most prohibited wastes is long over.

■ “OHM offers a range of treatment technologies designed for the on-site treatment of hazardous chemicals in soil. A brief description of our developed technologies is provided below. More complete information is provided on one of these technologies, treatment of K001 waste in a slurry-phase bioreactor in the attached summary.

OHM owns and operates two mobile thermal destruction units. Our Mobile Infrared Incinerator is designed to operate at a throughout rate of 6-12 tons/hour and to achieve 99.9999% (6-nines) destruction of organic chemicals in wastes. The system has been used at several sites in the United State and Canada for the destruction of persistent organics-contaminated soils (primarily PCBs, one site was a PCP site) and is currently operating at the Cleve Reber Superfund site in Louisiana. Assuming an average operating rate of 8 tons/hour, continuous operation, and 80% on-line utilization, the infrared unit can treat approximately 50,000 tons of organic-contaminated soil per year.” (OHM, CS2P-L0007)

Response: EPA notes the comment.

5.F.7 Metal Recovery Technologies

■ “1. We must take issue with the stated assumption that:

> “Although metal recovery technologies are available, they are not generally applicable to treating hazardous soils because of the relatively low levels of metal contamination typically found in the soil (relative to those necessary for economical recovery).”

Pilot trials of MRS Thermal Mercury Removal/Recovery Process have clearly demonstrated the economic viability of this technology when treating mercury-contaminated soils and its ability to produce a salable mercury for recycling. The treatment costs involved are well within the range estimated by the EPA for thermal processes operating, or planned, in other areas.” (Mercury Recovery Services CS2P-00086)

Response: The EPA concurs that physical/chemical separation processes may allow the homogenization of hazardous soils as well as the separation and subsequent concentration of metals from hazardous soils. Although the treatment standards for many metals contained in hazardous soil are based on the treatment performance of stabilization, EPA has based the treatment standard of mercury on solvent extraction. Further, the existing treatment standard for mercury in 268.49, may still require the recovery of mercury via retorting or a roasting technology. Residues from the retorting /roasting of hazardous soils may require further treatment if the TCLP levels of these residues is above the 10 times the UTS limit or the applicable leachable level.

■ “**Proposed Approach for Establishing Soil Treatment Standards**

9. We must respectfully disagree with the stated assumption that:

“Although metal recovery technologies are available, they are not generally applicable to treating hazardous soils because of the relatively low levels of metal contamination typically found in the soil (relative to those necessary for economical recovery).”

Pilot trials of PMET’s Physical Separation and Hydrometallurgical Processes have clearly demonstrated the technical and economic viability of these techniques for removing lead from lead-contaminated blasting abrasives, soils, and industrial wastes as compared to HTMR techniques for removing lead from lead-contaminated blasting abrasives, and disposal in landfills. Although neither of these processes are economically viable for the high volume commercial production of pig lead from concentrates or battery scrap, both are more economical than HTMR for eliminating the environmental and health hazards of lead in soils and industrial wastes… the primary purpose of the regulations in question.” (PMET CS2P-00096)

Response: For metal constituents, the UTS may not be achievable in contaminated soil even using model technologies such as stabilization or high temperature metal recovery. Stabilization technologies are sensitive to soil characteristics such as the presence of oxidizing agents and hydrated salts, the distribution of soil particle size and the concentrations of sulfate and chloride compounds. Various combinations of soil characteristics can impair the effectiveness or rate of reaction in stabilization technologies. For example, insoluble materials, such as materials that will pass through a number 200 mesh sieve, can delay setting and curing during stabilization, or small soil particles can coat larger soil particles weakening bonds between particles and cement or other reagents. High temperature metal recovery technologies may not be appropriate for some contaminated soil given the low concentrations of metals that might be present in the soil. In addition, clay and silt content in some soil matrices may add undesired impurities to the metal concentrates or alloys that are formed during high temperature metal recovery.

Although EPA has data showing that some soils can be treated to the existing universal treatment standards for metals using stabilization[58] and high temperature metals recovery, the Agency continues to believe that tailored soil treatment standards are appropriate for metal contaminated soil to ensure that the wide variety of soils can be effectively treated to meet the treatment standards. In addition, the soil treatment standards will have the added environmental benefit of encouraging greater use of innovative soil treatment technologies such as soil or enhanced soil (acid) washing. *Proposed BDAT Background Document for Hazardous Soils*, August 1993; *Technical Resource Document: Solidification/Stabilization and its Application to Waste Materials*, EPA/530/R-93/012,

[58] These soil treatment data have been claimed as confidential business information.

June 1993; and, *Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988.

5.F.8 Retorting

- "Unfortunately, as recognized by EPA, retorting capacity is extremely limited and cost prohibitive. The cost for prototype thermal desorption equipment is $800/cubic yard, with a minimum of a 1000 cubic yards treated at one location. Typically, only 2-3 cubic yards are generated at a mercury contaminated meter site. These meter sites are usually scattered over a wide geographic area. Thus a central treatment location is often not a viable option.

  Our research suggests that there are not economical commercially demonstrated technologies that can treat all mercury contaminated soils to below the 0.20 ppm TCLP level. Furthermore, EPA has not shown a need, based on a risk to human health or the environment, to treat below the 0.20 ppm TCLP. Therefore we urge EPA to adopt Option C with a minimum required treatment to the present action levels of 0.20 ppm TCLP for mercury contaminated levels. Furthermore, treatment above these levels should be accepted provided a demonstration is made that there is no significant risk to human health or the environment." (American Gas Association, CS2P-00165)

Response: EPA notes that the statue bars EPA from taking into account economical considerations when it establishes treatment standards. As with regard to the issue of treating below the TC characteristic level, this issue was settled in the Third Third final rule. See, also, Chemical Waste Management, 976 F. 2nd 2, 12-14.

EPA acknowledges that soil metal recovery processes such as soil washing, chemical/solvent extraction (e.g. heap leaching), retorting, roasting, and thermal desorption may leave behind soils that can attain a 90% reduction, as measured by total waste analysis (i.e., mg/kg) but may still be above applicable leachable limits (as measured by the TCLP). EPA has stated in the preamble that metal removal processes may comply with a total constituent concentration analysis (i.e., mg/kg).

- "Preliminary GRI research, primarily in the bench-scale and pilot scale stages, indicates that, depending on the type of soil, it may be difficult to treat below the 0.20 ppm TCLP level using only soil washing or gravimetric separation. Acid leaching may reduce the total mercury below the proposed 90 percent target, but its ability to consistently reduce the TCLP below 0.20 ppm for all soil types has not been demonstrated. This leaves retorting or thermal desorption as the only technologies and, as EPA recognizes, these technologies are very expensive and extremely limited. Furthermore, thermal desorption does not lend itself to a central treatment facility scenario. The use of this process, therefore, is not practical for this application." (Coastal, CS2P-00172)

Response: EPA acknowledges that soil metal recovery processes such as soil washing, chemical/solvent extraction (e.g. heap leaching), retorting, roasting, and thermal desorption may leave behind soils that can attain a 90% reduction, as measured by total waste analysis (i.e., mg/kg) but may still be above applicable leachable limits (as measured by the TCLP). EPA has stated in the preamble that metal removal processes may comply with a total constituent concentration analysis (i.e., mg/kg).

5.F.9 Biological Treatment/Biodegradation

- "BDAT for Soils

Although not specifically addressed in the proposal, the preamble suggests the proposed BDAT standards for contaminated soils are based in part on "biological treatment" in land treatment units. See Appendix A at 58 FR 48152. Insofar as the proposed standards are based on the use of such units, and/or EPA contemplates using such units for contaminated soils regulated as hazardous under Subtitle C of RCRA, the approach violates the land disposal restrictions of RCRA. As the court held in American Petroleum Institute v. EPA, 906 F.2d 729 (D.C. Cir. 1990), land treatment is a form of land disposal under RCRA, and the statute requires compliance with BDAT prior to land disposal. Accordingly, placement in a land treatment unit cannot be considered compliance with the statutory BDAT requirement." (Natural Resources Defense Council, CS2P-00179)

Response: EPA agrees with the commenter and have done so in the preamble:

> "EPA reminds program implementors that, consistent with the rest of the land disposal restriction program, site-specific determinations that threats are minimized cannot be based on the potential safety of land disposal units, or engineered structures such as liners, caps, slurry walls or any other practice occurring after land disposal. *American Petroleum Inst. v. EPA*, 906 F.2d 729, 735-36 (D.C. Cir. 1990) (land treatment cannot be considered in determining whether threats posed by land disposal have been minimized because land treatment is a type of land disposal and section 3004 (m) requires that threats be minimized before land disposal occurs); see also S. Rep. No. 284, 98th Cong. 1st sess. at 15, stating that engineered barriers cannot be considered in assessing no-migration variances because "[artificial barriers do not provide the assurances necessary to meet the standard." This means that site-specific minimize threat determinations must be based on the inherent threats any given contaminated soil would pose. The Agency recognizes that this will have the effect of precluding site-specific minimize threat variances for remedies that rely, even in part, on capping, containment or other physical or institutional controls. In addition to being compelled by the statute, the Agency believe this approach is proper, in that it may encourage remedy choices that rely more predominantly on treatment to permanently and significantly reduce the concentrations (or mobility) of hazardous constituents in contaminated soil. The Agency has a strong and longstanding preference for these types of more permanent remedial approaches. "

However, EPA also notes that in-situ treatment can occur without triggering LDR requirements given that no--placement of the waste on the land occurs. See preamble discussion and various remediation guidance documents.

- "In the last 5 years there has also been significant progress in the biological degradation of organic constituents in non-waste waters. Some of this work has been supported by EPA in the Superfund clean up program. For example, the Record of Decision for the French Limited site in Harris County, Texas (EPA, Region VI), specified in-situ biodegradation of organic chemical-contaminated sludges and soils as the selected remediation option. Extensive pilot testing of biodegradation by the principal responsible parties demonstrated the ability of the process to destroy a wide range of organic contaminants, including polynuclear aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs). There is no evidence that EPA reviewed any of these data for the development of the third standards.

Research on optimal methods for remediation of soil and ground water contaminated by spills or underground storage tank leaks has also demonstrated the feasibility of biodegradation for removing organic chemicals from non-waste waters. A technical reference list of key studies that support biodegradation of organic substances in waste waters and non-waste waters is included in this report." (CMA, CS2P-0122)

Response: More recent, full-scale data examined by the Agency corroborates our conclusion that the soil treatment standards can be reliably achieved using a variety of non-combustion remediation technologies. See (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562;and (3) Remediation Case Studies: Bioremediation, March 1995, EPA-542-R-95-002 or NTIS PB95-182911.

The particular study mentioned by the commenter is described in pages 43 through 68, in Remediation Case Studies: Bioremediation, March 1995, EPA-542-R-95-002 or NTIS PB95-182911. EPA has addressed this particular comment in the preamble.

- "OHM Remediation Services Corp. (OHM) is presently conducting the full-scale slurry-phase biological remediation of creosote-contaminated wastes at the Southeastern Wood Preserving Superfund site in Canton, Mississippi. This site is an abandoned wood preserving facility that was in operation from 1928 to 1979. The U.S. Environmental Protection Agency (USEPA) initiated an emergency response action at the site in June 1986, and excavated approximately 10,500 cubic yards of sludge and contaminated soils from lagoons, treatment facilities and storage areas. The lagoon material was considered to be bottom sediment and sludge from the treatment of wastewaters from wood preserving processes using creosote, and was classified as a Resource Conservation and Recovery Act (RCRA)-listed waste number K001. The excavated materials were stabilized with kiln dust and stockpiled on-site for further treatment.

  Polycyclic aromatic hydrocarbon (PAH)concentration in the stockpiled soil ranged from 8,000 mg/kg dry-weight to 2,500 mg/kg dry-weight for carcinogenic PAHs. Treatment efficiencies approaching 95 percent were achieved for total PAHs in the slurry-phase biological reactors, with the majority of the PAH biodegradation occurring in the initial 5 to 10 day of treatment (Jerger, 1993). Three-, four-, and five-ring PAHs were biodegraded 98 to 99 percent, 85 to 95 percent, and 55 to percent, respectively (Jerger, 1993)." (OHM, CS2P-00124.D)

Response: This full-scale operation is in complete agreement with the findings in EPA's soil data base with regard to the treatment performance of bioslurry processes. (See EPA 1993a and EPA 1998a.)

With regard to the treatment performance of biological treatment processes, the soil data base shows that this technology is among the most soil and constituent specific treatment technologies available for the treatment of hazardous soils. The technology will perform best in many compounds that are water soluble, amenable to volatilization, and amenable to co-metabolization. (EPA 1993a, EPA 1998a, EPA 1998c, EPA 1994, and cited academic literature in EPA 1998d.) For instance, many soluble and slightly soluble compounds can be treated to the regime of concentrations established today. The soil data base also shows that Pentachlorophenols, less soluble Polyaromatic hydrocarbons such as PNA's with four or more rings, aromatic chlorinated pesticides, and aromatic chlorinated pesticides are resistant or recalcitrant to biodegradation processes. PCPs and four to five ring PNAs biodegrade at much slower rates or attain an average treatment performance reduction range from 35 % to 70% which falls short from the 90% treatment regime established today. These recalcitrant constituents may require additional treatment by another technology train such as chemical dechlorina-tion (e.g., for non-volatile chlorinated organic pesticides/solvents and oily chlorinated organics such as PCB's and PCPs) or solvent extraction (high molecular weight PNA's and chlorinated organics).

EPA's findings with regard to the performance of bioremediation treatment processes (EPA 1993a, EPA 1998a, EPA 1998b, and EPA 1998d) are quite congruent with other bench-, pilot-, and full-scale operation of bioremediation processes (EPA1998a, EPA 1998d, HWTC 1993, and EPA 1994). EPA has determined, therefore, that the available biotreatment performance data support the establishment of treatment standards for many soluble polar organics,volatile aliphatic chlorinated/non-halogenated organics, non-halogenated aromatic, polar organics such as ketones, alcohols, and low molecular weight PNA's (two- to four-rings, generally).

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- "OHM Remediation Services Corp. is presently conducting the full-scale remediation of creosote-contaminated wastes at the Southeastern Wood Preserving Superfund site in Canton, Mississippi. This site is an abandoned wood preserving facility that was in operation from 1928 to 1979. The U.S. Environmental Protection Agency (EPA) initiated an emergency response action at the site in June 1986, and excavated approximately 8,000 yd^3 (6,100 m^3) of sludge and contaminated soil from lagoons, treatment facilities, and storage areas. The lagoon waste material was considered to be bottom sediment sludge from the treatment of wastewaters from wood preserving processes using creosote. This material is Resource Conservation and Recovery Act (RCRA)-listed waste number K001. The excavated materials were stabilized with kiln dust and stockpiled for treatment.

  Extensive laboratory treatability studies were performed to optimize the kinetics of the biological process for field pilot-scale testing and full-scale treatment operation. The final system configuration included a soil classification/washing process that concentrated the contaminants into a smaller volume of material for slurry reactor treatment and produced a washed soil product." (OHM, CS2P-00124.D)

Response: EPA has examined this full-scale data within the context of corroborative data supporting the establishment of treatment standards for hazardous soils. This full-scale demonstration study was published in the Superfund 1997 study titled: Case Study Abstract: Slurry Phase Bioremediation at the Southeastern Wood Preserving Superfund Site, Canton, Mississippi, pages 76-105, Remediation Case Studies: Bioremediation and Vitrification, Volume 5, July 1997, (EPA 542-R-97-008 or **NTIS: PB97-177554**).

- "OHM performs both in situ and ex situ bioremediation using various technologies including land farming, soil venting, groundwater extraction and ex situ treatment, and bioslurry reactors. In conjunction with our patented soil vapor extraction technology, we can also perform in situ air sparging. OHM is currently working through the SITE program to evaluate the commercial application of an in situ oxygen delivery system, Microbubble Technology.

Simple technologies such as land farming have essentially limitless capacity but are limited in their capability to degrade certain waste types. Ex situ soil venting (also presenting essentially unlimited capacity) is more efficient than land farming but still somewhat limited in terms of treatment efficiencies. However, OHM has had some success in treating wastes containing low levels of PAHs with this technology at Wordsmith Air Force Base in Michigan.

The bioremediation technology that appears most effective for difficult to degrade waste materials (K001, etc) is treatment in bioslurry reactors. Treatment with this technology is somewhat more capacity limited than land farming or bioventing, as reactor vessels must be constructed, however, these vessels, similar in design to modular sewage treatment systems, can be constructed fairly rapidly and although current capacity may be limited (OHM has four 200,000 gallon reactor vessels), sufficient capacity to treat most wastes requiring this technology could be generated in a very short time period using modular tanks and off-the-shelf components." (OHM, CS2P-L0007)

Response: OHM's findings with regard to the effectiveness of bioslurry systems on a wide range of organics and PAH's appear congruent with EPA's findings in the soil data base. See EPA 1993a and EPA 1998a.

References:

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

■ "As a result of former industrial activities, many properties across the United States contain various chemicals in their soils at concentrations above background levels. Polynuclear aromatic hydrocarbons (PAHs) are often encountered at sites of gas manufacture, wood treating, tar refining, coke making, and petroleum refining. When the presence of PAHs in site soil is deemed to create a situation of unacceptable risk to public health or the environment, treatment or disposal is required to reduce concentrations to acceptable levels.

The ideal remedial process for PAHs in soils would destroy them to an environmentally sound level at relatively low cost without producing adverse by-products. In many cases bioremediation can accomplish these goals. The degree to which bioremediation can destroy PAHs in a particular soil, however, is highly dependent on the characteristics of that soil, including the nature of the hydrocarbon that is the source of the PAHs.

It is the objective of this article to describe efforts leading to this conclusion and to summarize how soil characteristics influence bioremediation of PAHs." (Remediation Technologies, CS2P-

00133.B)

Response: Soils do not need to be treated to reduce hazardous constituents to levels below those of naturally occurring background levels, under circumstances discussed in the preamble to the final rule.

- "If it is EPA's intent to require the application of LDRs to petroleum contaminated-media, then we believe biological treatment is an ideal site cleanup technology. This is because it is easily deployed, cost effective, and efficient at removing any potential risk associated with petroleum contamination. When properly applied, organic compounds are digested leaving only those compounds deep in the soil pores that are unaccessible to bacteria or any other living thing. We recommend that biological treatment be defined as a BDAT technology provided that when applied, the technology achieves a 90% reduction in the leachability of organic compounds or meets a specific leachate standard to be developed specifically for this technology. This standard would be an indicator of a well operated biological treatment process and would not be applicable to other technologies.

  The docket comments by RETEC and OHM demonstrate the performance potential of biological treatment. You will note that the land ban standards designed to evaluate incinerator performance (not risk) are difficult for biological treatment to attain. The key problem is with high molecular weight polynuclear aromatic hydrocarbons (PNAs). PNAs have posed the greatest treatment challenges as they strongly adsorb into soils making some fraction of them non-leachable and non-available for digestion by the bacteria." (Chevron, CS2P-00182) [Also see Chapter 27.A.]

Response: Contaminated soils can be treated with non-combustion technologies to achieve the treatment standards in the final rule. (EPA 1998a, EPA 1998b, EPA 1998c, and EPA 1998d.)

EPA disagrees with the commenter's proposal that a 90% reduction in leachate extract concentration of organics (as measured by the TCLP). This issue was settled in the Phase II final rule. See Response to Comments Document on treatment standards for petroleum refining wastes.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

5.F.10 Soil Washing

- "**9.0 SOIL WASHING INNOVATIVE TECHNOLOGY DATA**

In response to EPA's request for comments on the proposed soil LDR regulations, DuPont has compiled the attached technical information package supporting Soil Washing as an innovative technology for remediating contaminated soil. DuPont surveyed EPA, academic and industry information to identify vendors with both experience and fundamental soil washing understanding. The vendor experience information was organized into table detailing bench scale, pilot scale and full scale capability. Understanding of contaminant-soil interactions, physical soil washing and chemistry needed to remediate contaminated soil was captured during interviews with vendors and summarized. The overall purpose of this package is to share our data with EP A and to promote soil washing as an effective and cost effective innovative remediation technology. We will shortly submit similar packages for low temperature thermal desorption and organics stabilization technologies.

An effort was made however to screen vendors. Experience, equipment capability, support labs, staff knowledge and regulatory expertise were factors considered in selecting soil washing vendors for follow-up interviews. The selected vendors are included in this package.

While determining the current state-of-the-art of soil washing, DuPont confirmed that more vendors have demonstrated bench and pilot scale experience/capabilities than full scale experience. Experience with metals and inorganic contaminants is also greater than with organics. We believe this does not reflect poorly on the capability of the technology to remediate. As the experience pool for technically and financially favorable soil washing grows, more full scale remediation experience and data will become available.

DuPont Definition of Soil Washing

For the purpose of this information, DuPont has limited the soil washing review to aqueous based soil washing only. In all cases, a water based solution is mixed with contaminated soil. Soil is cleaned and recovered in the process. Contaminated residues and wash water are treated and then recycled or disposed of. In some cases, surfactants and flocculants are added to the water to enhance soil particle separation. In other cases, chemical agents such as acids or chelants are used to promote mass transfer of soil contaminants into the aqueous phase.

Description of Attachments/Enclosures

This information package is mainly compiled from information obtained from interviews and discussions with the vendors. In one case DuPont provided a soil sample and funded leaching/extraction treatability work.

This information package contains the following specific information:

a. Vendor Experience Tables-These tables summarize the following information for selected vendors:

Vendor-selected vendor that DuPont interviewed

Patent status-patent technology ownership status

Matrix treated-matrix type, with site location (if available)

Contaminant-contaminant of interest in matrix

Performance (concentration)-contaminant concentration in matrix, both before treatment and after treatment

Throughput- Throughput or processing rate

Scale-Process scale (bench, pilot, or full scale)

Cost- Processing cost ($/ton)

b. Source documentation and data re also available for each selected vendor that was interviewed by DuPont. This information is summarized and documented in a "Technology Summary," a DuPont write-up that includes vendor contacts, process description and application information and process costs. Selected vendor literature and information is also included." (DuPont, CS2P-L0003)

Response: EPA has data on the pilot- and bench-scale operation of soil washing technologies. In addition to the bench- and pilot-scale data submitted by Dupont and the HWTC (HWTC 1993), the EPA has data from the Superfund 1995 full-scale demonstration operations of soil washing are feasible including those that can meet the treatment standards established by today's final rule.

References:
EPA 1995a, July 1995, Contaminants and Remedial Options at Selected Metal-Contaminated Sites, Office of Research and Development, Washington, D. C. (EPA/540/R-95/512 or **NTIS**: **PB95-271961**)

EPA 1995 b, March 1995, Remediation Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995

- "**EPA solicits treatability data and other information relevant to the hazardous soil treatment standards proposed.**

Environmental Restoration programs for particular DOE sites and the DOE Office of Technology Development have been preparing treatability test reports and technology status reports (on various technologies such as heat enhanced soil vapor extraction, bioremediation, in-situ vitrification). Other studies are in progress but complete data are not yet available (e.g., Westinghouse is currently conducting pilot-scale soil washing treatability tests on RMW-contaminated soils at the 300 N area at the Hanford site)." (DOE, CS2P-00161)

Response: EPA has data on the pilot- and bench-scale operation of soil washing technologies. In addition to the bench- and pilot-scale data submitted by Dupont and the HWTC (HWTC 1993), the EPA has data from the Superfund 1995 full-scale demonstration operations of soil washing are feasible including those that can meet the treatment standards established by today's final rule. (EPA 1995a, EPA 1995b)

References:

EPA 1995a, July 1995, Contaminants and Remedial Options at Selected Metal-Contaminated Sites, Office of Research and Development, Washington, D. C. (EPA/540/R-95/512 or **NTIS**: **PB95-271961**)

EPA 1995 b, March 1995, Remediation Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995

- "Biogenesis Enterprises, Inc., is a leading, innovative soil washing firm that offers ecologically sound and effective solutions to industrial contamination problems. Our soil and sediment washing processes have been successfully demonstrated at a refinery under the U.S.EPA SITE Demonstration Program in November, 1992 and under Environment Canada's Great Lakes Cleanup Program at Thunder Bay, Ontario....

  We support regulatory review and change when such a change will improve and update technical knowledge as in the case of health based universal standards proposed in this docket. Moving away from thermal technologies as the BDAT for all wastes encourages the development and use of other technologies for remediation. Innovative technologies, such as our soil and sediment washing units, are developed and enhanced due to a market that encourages such development. Combustion, as the sole source BDAT, discourages the refinement of potential technologies that presently achieve safe and effective reduction of contamination to levels that pose no threat to human health or the environment." (Biogenesis Enterprises, Inc., CS2P-00180) [Also see Chapter 27.A.]

Response: EPA has data on the pilot- and bench-scale operation of soil washing technologies. In addition to the bench- and pilot-scale data submitted by Dupont and the HWTC (HWTC 1993), the EPA has data from the Superfund 1995 full-scale demonstration operations of soil washing are feasible including those that can meet the treatment standards established by today's final rule. (EPA 1995a, EPA 1995b)

References:

EPA 1995a, July 1995, Contaminants and Remedial Options at Selected Metal-Contaminated Sites, Office of Research and Development, Washington, D. C. (EPA/540/R-95/512 or **NTIS**: **PB95-271961**)

EPA 1995 b, March 1995, Remediation Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995

5.F.11 Soil Vapor Extraction

- "In-situ treatment of hazardous soils should be encouraged. Soil vapor extraction should be added to the list of acceptable alternative treatment technologies for hazardous soils. Soils that have been treated to health based levels should not be hazardous waste. Rather, the treated soils should be managed in Subtitle D facilities and any residue from treatment should be managed as appropriate under RCRA. This is analogous to the current regulation of hazardous debris." (Rohm and Haas Company, CS2P-00114)

Response: EPA agrees that soil vapor extraction should be encouraged. EPA does not agree with the comment that hazardous media is exempted from Subtitle C requirements. This particular issue will be addressed in the final HWIR media for hazardous soils.

More recent, full-scale data examined by the Agency corroborates our conclusion that the soil treatment standards can be reliably achieved using a variety of non-incineration remediation technologies. (EPA 1997b,EPA 1997c, EPA1995b, and EPA 1995c) For organic constituents, the soil treatment standards for volatile organic constituents are based on the performance of biotreatment, chemical extraction, dechlorination, thermal desorption or soil vapor extraction. The standards for semivolatile organic constituents are based on the performance of biotreatment, chemical extraction, dechlorination, soil washing, thermal desorption, or soil vapor extraction.

Based on 236 data points, EPA concludes that nonpolar organics treated by soil vapor extraction can meet, generally, the soil treatment standards established today. Out of 236 data points, 189 show that volatile organics can achieve average treatment efficiencies that range from 44% to 99.2%. 47 data points show that semivolatile organics can undergo treatment with treatment efficiencies that range up to 57.2%. These data show that organics with high Henry's Law constants are more amenable to soil vapor extraction. The available data also show that the efficiency of the technology drops significantly (sometimes to the point of ineffectiveness) when treating soils contaminated with aromatic or cyclical semivolatile organics. (EPA 1998c)

References:

EPA 1997b, July 1997, Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562

EPA 1997c, September 1997, Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007

EPA 1995b, Remediation Case Studies: Soil Vapor Extraction , EPA-542-R-95-004 or NTIS: PB95-182937

EPA 1995c, March 1995, Remediation Case Studies: Groundwater Treatment, EPA-542-R-95-003 or NTIS: PB95-182929

- "OHM performs soil vapor extraction (SVE) under our existing patent which entails withdrawal and reinjection of fluids. We have performed several SVE field projects and also have data from several pilot studies. Our capabilities in SVE are best demonstrated by work at the Sand Creek Superfund Site in Colorado, where over 120,000 pounds of petroleum materials were removed in 3 months. Our capacity in this technology is currently somewhat limited by having only a small but rapidly expanding pool of individuals with expertise in SVE and by the availability of equipment (pumps; treatment systems). However, as for the bioslurry reactors noted above, SVE systems are constructed using modular parts and off-the-shelf components and sufficient capacity to treat most wastes amenable to this technology could be generated in a very short period of time.

  OHM appreciates the opportunity to comment on these proposed regulations. Thank you for your consideration of these comments." (OHM Corporation, CS2P-L0007)

Response: EPA notes the comment.

5.F.12 Data Submitted on Other Innovative Technologies

- "STATEMENT OF INTEREST

  The HT-6 process, when operating to recover recyclable oil from hydrocarbon-bearing wastes and soils, is a reclamation process which does not require a Resource Conservation and Recovery Act ("RCRA"), 42 U.S.C., Section 6901, et seq., permit. 40 CFR 261.6(c)(1). Additionally, and due to the removal and recovery capabilities of the process, RCRA voices a strong preference for HT-6 type technologies. See e.g., H.R. Rep. No. 198, 98th Cong. 1st Sess. 31.

  In excess of 30 million dollars, over the course of the past four years, has been spent in the commercialization of this innovative technology. The technology was commercialized as a direct result based on Best Demonstrated Available Technologies (BDAT) demonstrated capabilities. The results of this commercialization is an innovative technology, the HT-6, which can treat both as generated wastes and soils to the equivalent capability of incineration without burning the wastes while concurrently recovering reusable and recyclable oil." (Seaview Thermal Systems, CS2P-00058)

Response: The new rule will facilitate the use of innovative soil treatment technologies. EPA recognizes that non-noncombustion technologies are capable of meeting the proposed limits for organics and metal constituents found in hazardous soils, 10 x UTS levels, or the 90% reduction in total or leachable concentration of hazardous constituents present in hazardous soils. Recent, full-scale data examined by EPA corroborates the Agency's conclusion that the soil treatment standards can be reliably achieved using a variety of non-incineration remediation technologies.[59] (Also, see Chapter 3 and 4 in EPA 1998a)

EPA also recognizes the potential problems and difficulties associated with incineration. It is generally unsuitable or impractical to burn large volumes of mildly contaminated soil. See, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806-18808 (April 29, 1996). In addition, EPA has documented the difficulties that may arise from the combustion of soil due to soil-contaminant characteristics that affect incineration performance (e.g., concentrations of volatile metals, the presence of alkali salts, fine particles of soil such as clay and silt, and the ash fusion point of the contaminating waste).

Reference:

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

■ "STS builds, markets, and operates the HT-6 High Temperature Thermal Distillation process (HT-6) for the purpose of treating a wide variety of as-generated wastes (such as refinery listed wastes K048-K052, F037, and F038), as well as contaminated soils (such as PCB, PCP, K087, Dioxin, and petroleum contaminated soils). The HT-6 process is the functional equivalent to the HT-5 process which was formerly owned and operated by TDI Thermal Dynamics.

The HT-5/HT-6 process has successfully operated on a full scale basis for the purpose of achieving LDR standards on listed wastes K048 through K052. Documentation of the HT-6 capability to process refinery wastes has previously been submitted to the EPA by TDI on February 20, 1992, and such documentation is hereby incorporated by reference.

The EPA is requesting additional information regarding the capabilities of innovative technologies. As noted in Comment Number 1, above, the HT-6 has demonstrated the ability to significantly treat wastes and soils. This ability is "matrix-independent" and is achieved irrespective of whether or not the waste is homogeneous or heterogeneous. Additionally, the HT-6 process is recognized by the hazardous waste industry to be an extremely well operated and well designed treatment process.

Included in Attachment "A" is pilot scaled data on the processing of Manufactured Gas Plant (MGP) wastes. MGP wastes are extremely heterogeneous and contain significant concentration of poly-nuclear aromatic hydrocarbons existing in a tar-like matrix. The tar-like wastes are typically mixed with soils and are analogous to other regulated waste such as K087, K141-145, K147, and K148. As documented in Attachment "A", the HT-6 process removed all the regulated organic constituents from the contaminated soil to nondetectable concentrations while currently recovering the hydrocarbons in the recyclable form of oil. This demonstrated ability is an additional example of the

[59] See (1) Remediation Case Studies: Bioremediation and Vitrification, July 1997, EPA 542-R-97-008 or PB97-177554; (2) Remediation Case Studies: Soil Vapor Extraction and Other In Situ Technologies, July 1997, EPA 542-R-97-009 or NTIS PB97-177562; (3) Analysis of Selected Enhancements for Soil Vapor Extraction, September 1997, EPA-542-R-97-007; (4) Remedial Case Studies: Thermal Desorption, Soil Washing, and In Situ Vitrification , March 1995, EPA 542-R-95-005 or NTIS PB95-182945; (5) Remediation Case Studies: Soil Vapor Extraction, March 1995, EPA-542-R-95-004 or NTIS PB95-182937; and (6) Remediation Case Studies: Bioremediation, March 1995, EPA-542-R-95-002 or NTIS PB95-182911.

capabilities of innovative technologies to achieve treatment levels which are significantly lower than the proposed universal standards and more protective of human health and the environment." (Seaview Thermal Systems, CS2P-00058)

Response: EPA recognizes that many innovative technologies can provide treatment capable of meeting the proposed limits for organics and metal constituents found in hazardous soils, 10 x UTS levels, or the 90% reduction in total or leachable concentration of hazardous constituents present in hazardous soils. This conclusion is confirmed in the full scale and pilot scale testing. EPA also recognizes how soil matrix may interfere with treatment, but believes that good engineering practices can be employed to meet the treatment objectives set by EPA's new standards. (EPA 1998a)

Reference:

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

■ "The RCRA Land Disposal Restriction regulations require certain characteristic and listed hazardous wastes to meet Best Demonstrated Available Technology (BDAT) treatment standards prior to land disposal. These treatment standards are based on data from treatment performance tests using specific hazardous wastes and appropriate BDAT technologies. These treatment standards have also been determined to be applicable to soil and debris contaminated with these wastes at CERCLA and RCRA corrective action sites. The EPA has been gathering data on the treatment of contamination soils and debris (CS&D) associated with a variety of wastes, and will be sampling and collecting soils from some representative CERCLA sites to perform treatability and treatment performance testing in order to develop the data bases necessary to support proposed BDAT treatment standards for contaminated soil and debris.

TDI Services, Inc., has developed a proprietary high temperature distillation system (HT-5) which has initially been selected by EPA to be evaluated for treatment of soils contaminated with creosote (U051 classification) and petroleum refinery wastes (K048-K052 classification). Tom F. DesOrmeaux has issued the license for operation of the HT-5 to BFI - Thermal Dynamics (BFI-TD). BFI-TD has conducted initial treatability testing of the HT-5 Thermal Distillation Unit by processing a simulated refinery waste (Phase I). Follow-on Phase II testing is scheduled to involve treatment performance testing and residuals analyses of an actual Superfund waste from a yet to be determined site. BFI-TD has also conducted simultaneous treatability testing of the simulated refinery sludge utilizing a pilot scale unit (PSU) to simulate HT-5 treatment and will continue to treat the same feedstock treated in the HT-5. The objective of the PSU testing program is to evaluate the design equivalency and the ability of the PSU to provide scale-up data correlating to the treatment capability of the HT-5.

Law Environmental, Inc. has planned, performed and interpreted the environmental analysis of the initial refinery sludge treatability testing of the HT-5 distillation unit for BFI-Thermal Dynamics. Law Environmental will also plan and perform subsequent environmental evaluations for the EPA. The initial treatability test was performed on a simulated refinery waste prepared by adding Alaskan crude oil to oil based drilling cuttings to achieve a hydrocarbon content of approximately 15%. The test was conducted over a three day period in January 1990. All analytical samples were collected and analyzed according to an approved Quality Assurance Project Plan. The analytical procedures used are approved EPA methods. A QA/QC concept beginning with sample collection and ending with data validation was applied. Feedstock and treated residue samples were collected and analyzed to demonstrated treatment removal efficiencies and verify residuals contaminant levels for comparison to current BDAT. Additional analyses were conducted on recovered oils and wastewater which are by-products of the treatment process. The oil analyses were performed to characterized them for purposes of recycle/reuse. The wastewater analyses were performed for normal NPDES discharge parameters even though the wastewater would normally be recycled in a refinery setting. Treated residue contaminant concentrations in the HT-5 and PSU samples are below land ban performance parameters listed in the current version (July 1, 1989) 40 CFR Part 268, Subpart D with the exception of the TCLP nickel. Nickel is a major component of the alloy used to construct the PSU tray and the HT-5 heating chambers, as is chromium. The TCLP nickel may be due to initial wearing in the heating chambers and cooling auger. The generally higher total chromium and nickel contents in the treated residue support this contention. Air emissions data indicate that particulates are no problem and that no detectable hydrocarbons were present in the flare gas, but is not completely certain that this test configuration would produce hydrocarbon emissions equivalent to a normal refinery HT-5 system.

This HT-5 High Distillation Unit treatability test of simulated refinery wastes has produced residuals which meet the BDAT requirements specified (except TCLP nickel) by the U.S. EPA for refinery wastes in 40 CFR 268.41 Tables CCWE and CCW. We expect the wearing-in of the system to eliminate the excess TCLP-nickel criteria. The demonstrated removal efficiency of the HT-5 for organics is a good indicator for success in removal of contaminants from creosote and other listed organic wastes in Superfund sites. Results of a PSU treatability test on a soil sample from the Bayou Bonfouca Superfund site showed no detectable BDAT organic constituents in the treated residue (Memo to Jerry Vorbach, EPA/OSW from Debra Falatko, Radian Corporation dated December 22, 1989). A treatment performance test for the Bonfouca waste is planned later in 1990 in conjunction with the EPA and Radian." (BFI-Thermal Dynamics, CS2P-00058.A)

Response: EPA believes that the soil treatment standards will encourage greater use of innovative soil treatment technologies including technologies focused on the treatment of sludges. *See Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988. EPA has also determined that the pilot scale demonstration study at the Bayou Bonfouca Superfund Site in Louisiana yielded significant information on the effectiveness of chemical extraction on difficult-to-treat soils. This demonstration study examined the effectiveness of chemical extraction in treating semivolatile organics from a creosote treatment works facility where the organics were present in silt loam soils. The overall average performance efficiency of the RCC's B.E.S.T.'s™ Process was over 99% for semivolatile with polynuclear aromatics (PNAs) in concentrations up to 1,600 ppm, cresols up to 160 ppm, and phenol up to 160 ppm. (EPA 1998)

Reference:

EPA 1998a, April 1998, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

- “The enclosed report describes the test conditions, test procedures, and the results of the sample analyses performed on the dioxin contaminated feed, gaseous emissions, condensed residual water and treated residue. The test was performed on April 25, 1991, using the soil, diesel fuel, and dioxin solution provided by yourself.

  a treatability study was performed in order to document the potential of the HT-V Thermal Distillation System (HT-V) in conjunction with the HT-V Thermal Degradation System to treat a polychlorinated dioxin contaminated soil and produce nontoxic residue and condensables. Previous tests (see April 5 report, (“PCB Bench ScaleTreatability Test”) have demonstrated that the HT-V is capable of removal of PCBs from an oily sludge matrix to produce a nontoxic treated residue and PCB contaminated condensed oil. While toxic component removal is attractive from the standpoint of waste volume reduction, it is highly desirable to have a stand alone process which can degrade/dechlorinate PCBs, dioxin and other chlorinated toxic compounds to produce only nontoxic residue and recoverable products such as oil and water. Such a stand alone process is not currently available in the waste treatment industry and is in great demand.

  Addition of catalyst to enhance degradation/dechlorination of PCBs, dioxins and other chlorinated toxic wastes is a feasible design modification to the HT-V process. The addition of the HT-V Thermal Degradation System can provide this additional capability. Southdown has, therefore, recently modified the bench scale unit (BSU) used for HT-V treatability testing by the addition of a high temperature (up to 2100 degrees F) degradation/dechlorination chamber. This modified BSU was used to test the effect of a catalytic enhancement of degradation/dechlorination of dioxins. The test was performed by processing a 2378-tetrachlorodibenzodioxin (TCDD) contaminated sludge.

  The primary objectives of the test were to:

  a. Determine the dioxin destruction/removal efficiency (DRE) for 2378-tetrachlorodibenzodioxin.
  b. Determine if any new regulated toxic compounds (non present in the feed) are synthesized by the process.

  The results of the tests document that:

  a. The sweep gas DRE for 2378-TCDD was >99.999577%, no 2378-TCDD was detected in the treated residue or condensate.
  b. There was no significant production of new toxic compounds synthesized by the process.

  The results of a thorough data quality validation document that all data is acceptable from a standpoint of data quality given the high oil content of the feed samples and the high absorptivity of the treated residue due to it’s extremely low organic content.” (Law Environmental, Inc., CS2P-00058.F)

Response: EPA has established technology-based soil treatment standards which can be satisfied using any treatment method except treatment methods which involve impermissible dilution (e.g., addition of volume without destroying, removing or immobilizing hazardous constituents). One example of a treatment standard that can reliably achieve soil treatment standards is thermal desorption.

EPA based its soil treatment standards for some contaminants, in part, on the treatment capabilities provided by thermal desorption. The soil treatment standards for dioxins and furans are based on the performance of dechlorination or thermal desorption. The treatment standards for polychlorinated biphenyls are based on the performance of chemical extraction, dechlorination, or thermal desorption.

Information within EPA's Soil Treatment Database as corroborated by recent performance data for non-combustion treatment of remediation wastes, has established that thermal desorption represents an effective treatment technology. Based on 957 data points, thermal desorption has been shown to treat a wide range of organics in soils to meet the alternative hazardous soils treatment standards. Out of these 957 data points, 293 show that volatile organics can undergo thermal desorption treatment with average treatment efficiencies that range from 79.2% to 99.9%. 614 data points show that semivolatile can undergo thermal desorption with average treatment efficiencies that range from 50% to 99.4%. 12 data points show that treatment of semivolatile organochlorine constituents will yield treatment efficiencies that range from 88.5% to 98%. There is one datum showing that PCBs can undergo thermal desorption with a treatment efficiency of 87.5%. 37 data points show that thermal desorption of dioxin and furan constituents can achieve treatment efficiencies that range from 85.6% to 97.6%. Based on the consulted literature (EPA 1998a, EPA 1998d, EPA 1994, and the corroborative data in the 1995 EPA Superfund Studies --EPA 1995b), EPA believes that thermal desorbers are among those technologies that will be able to attain the treatment standards on a broad spectrum of soil-contaminanted matrices. EPA is relying, therefore, on thermal desorption as one of many technologies capable of achieving the treatment standards promulgated today.

References:

EPA 1998a, <u>Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies</u>, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"<u>Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds,</u>" April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"<u>Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble,</u>" April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "<u>Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation</u>," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1995b, March 1995, <u>Remediation Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification</u>, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

- "The treatability test was performed in order to demonstrate and document the capability of utilizing high temperature thermal distillation to remove and recover a wide range of volatile and semi volatile compounds from the waste. The treatability test was performed on a waste matrix consisting of a 1:1 mixture of contaminated soil and tar sludge obtained form the P.S.E. & G., Paterson site.

  Operating temperatures of 1800 degrees F. produced an ash like residue void of visual oil/tar. The residue exhibited no odor. Analytical data obtained from testing the waste and residue produced by the pilot scale unit indicate:

  1. Pre-treated waste contained a variety of volatile compounds in concentrations ranging between 28 ppm and 320 ppm. Semivolatile compounds existed in concentrations ranging form 32 ppm to 320 ppm.

  2. Treated residue contained non-detectable concentrations of volatile compounds at detection limit concentrations ranging from 0.31 ppm to 0.62 ppm. Non-detectable concentrations of semivolatile compounds existed at detection levels ranging from 0.33 ppm to 1.6 ppm.

  The results of a thorough data quality validation documents that all data is acceptable form a standpoint of data quality given the high oil content of the feed samples and the high adsorbtivity of the treated residue due to it's extremely low organic content.

  In review, the treatability test verifies that both the contaminated soil and tar sludge can be successfully processed by the HT-V High Temperature Thermal Distillation process and result in the production of a recyclable oil and non-hazardous residual soil." (TDI Thermal Dynamics, CS2P-00058.H)

Response: EPA agrees with the commenter that soils contaminated with tar sludges can be treated to treatment standards promulgated today by thermal desorption. EPA's treatment data show the achievability of the treatment standards at many sites contaminated with complex PNA, creosote, and PCB admixtures. (EPA 1998a, EPA 1997a, EPA 1995a, EPA 1994, EPA 1993b, and EPA 1994).

EPA's rule is intended to facilitate the use of innovative soil treatment technologies. The soil treatment standards may be achieved using any treatment method except treatment methods which involve impermissible dilution (e.g., addition of volume without destroying, removing or immobilizing hazardous constituents). The practice of adding make up soil to enable thermal desorption may not constitute impermissible dilution; in particular, if the soil is contaminated with tar and petroleum oily sludges.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- “Attached, please find some recent articles authored by SRS personnel which contain data indicating compliance with levels proposed in this rulemaking. In response to the agency’s request for comments regarding raising the proposed levels to promote other innovative technologies, SRS would offer that it has experimented with a number of variations of solvent extraction low temperature thermal desorption and bioremediation to achieve existing LDR standards. Except to the extent that the agency is willing to utilize a total VOC and SVOC concentration, SRS does not believe that even existing LDR standards can be met with the high confidence levels required by SRS customers.

  SRS is currently in the final stages of procuring a license from EPA for the Base-Catalyzed Decomposition (BCD) Process to dechlorinate dioxins and furan wastes, PCB’s, and thermally sensitive halocarbons. Dechlorination using EPA’s patented chemistry is achieved using SRS’S SAREX Process to first desorb and decompose halocarbons in a solids react, followed by condensing the desorbed stream for subsequent final dechlorination in a liquid reactor. This technology meets the definition of recycling as the dechlorinated oil from this process can be utilized for energy recovery in a cement kiln. STS recently completed an EPA SITE demonstration test using the BCD Process at the Kopper Superfund Site in Morrisville, NC. Preliminary laboratory data results indicated that the levels achieved in the SITE demonstration would meet the limits proposed in this rulemaking. SRS requests that EPA reconsider its position in not allowing an innovative technology such as the BCD Process from being utilized for F024 and other wastes containing dioxins and furans, therefore further supporting the agency’s desire to promote noncombustion technologies which also lead to beneficial reuse of the recovered materials.” (Separation and Recovery Systems, INC., CS2P-00138)

Response: EPA disagrees with the commenter that higher limits or total SVOCs and VOCS are needed to attain compliance with the treatment standards.

Data from EPA's Soil Treatment Database indicate that the soil treatment standards established by EPA in this rule are achievable through the use of a variety of remedial technologies. The treatment standards can be reliably achieved using biological treatment, chemical extraction, dechlorination, soil washing, stabilization, and thermal desorption. Because soil treatment is generally matrix dependent, the exact treatment technology to be applied would depend on the specific properties of the soil and the hazardous constituents of concern. Thus, not all soil treatment technologies will be capable of treating every contaminated soil to meet the standards adopted in this rule. However, the Agency finds that the standards typically can be achieved by thermal desorption, one of other non-combustion technologies demonstrated in full-scale operation, even in the case of hard-to-treat hazardous constituents such as dioxins, furans, polychlorinated biphenyls, and polynuclear aromatics. (See Appendix D in EPA 1998a , EPA 1997a, EPA 1995b).

The standards for volatile and semivolatile organic constituents are based, in part, on the performance of bioremediation. EPA considered dechlorination and thermal desorption in its standard setting process. EPA partially based the standards for polychlorinated biphenyls, dioxins, and furans the performance of dechlorination and thermal desorption.

Thermal desorption has been shown to treat a relative wide range of organics in soils to meet the alternative hazardous soils treatment standards established today. Out of 957 data points, 293 show that volatile organics can undergo thermal desorption treatment with average treatment efficiencies that range from 79.2% to 99.9%. 614 data points show that semivolatile organics can undergo thermal desorption with average treatment efficiencies that range from 50% to 99.4%. 12 data points show that treatment of semivolatile organochlorine constituents will yield treatment efficiencies that range from 88.5% to 98%. There is one datum showing that PCBs can undergo thermal desorption with a treatment efficiency of 87.5%. 37 data points show that thermal desorption of dioxin and furan constituents can achieve treatment efficiencies that range from 85.6% to 97.6%. EPA lacks performance data for thermal desorption of phenoxyacetic acid and organophosphorus constituents. (EPA 1998c)

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood

Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

EPA 1995b, March 1995, Remediation Case Studies: Thermal Desorption, Soil Washing, and In situ Vitrification, EPA- 542-R-95-005 or NTIS: PB95-182945, March 1995

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council,
(EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council.
(See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

- "If hazardous constituents on soil are remediated to less than background levels, it should be allowable to return the soil to the same location. In addition, if a recovery technology is used, the clean-up process should not considered hazardous waste management. Attached is information (partially confidential) regarding a soil remediation technology we have ready used to recover product from a pipeline leak and return the soil to the excavation. This project was under supervision of the state agency." (Occidental Chemical Corporation, CS2P-00143)

Response: EPA has explained that remediation activities involving replacement of treated soils onto the land is not a type of use constituting disposal, in part, since it is a supervised remediation instead of an unsupervised recycling activity. 62 FR 26063 (May 12, 1997). This interpretation is not affected by today's rulemaking.

It should be clarified, however, that other restrictions apply to hazardous contaminated soils used to produce products which are subsequently used in a manner constituting disposal (i.e., used to produce products which are placed in or on the land). Currently, hazardous waste-derived products used in a manner constituting disposal must comply with the applicable land disposal restriction treatment standards in 40 CFR Part 268. 40 CFR 266.23(a). Hazardous contaminated soil used to produce products that are subsequently used in a manner constituting disposal must continue to meet the universal treatment standards and therefore are ineligible for the soil treatment standards promulgated under this rule.

- "Soil Treatment Database; EPA Request for Soil Treatability Information

  In the Supplemental Notice, as in the initial Phase II proposal, EPA solicited comment on the existing

Agency soil treatment database as well as new soil treatability data. API is in the process of evaluating the Agency's soil treatment database, and has solicited soil treatment information from API members. API plans to comment in more detail on the EPA soil treatment database in conjunction with the HWIR proposal, anticipated in early 1995. API will, however, transmit to EPA any soil treatability information received from member companies as it becomes available both before, and along with, comments on the HWIR contaminated media proposal." (API, CS2P-00169)

Response: EPA believes the Soil Treatment Database provides information that justifies the achievability and reasonableness of EPA's soil treatment standards. After screening the database to eliminate inappropriate data,[60] the Agency was left with 2,541 data pairs representing treatment of eighty hazardous constituents including nine BDAT list metals. a complete discussion of the Agency's method for screening the Soil Treatment Database can be found in the LDR Phase II proposal (58 FR 48129 - 48131, September 14, 1993) and the Best Demonstrated Available Technology Background Document for Hazardous Soil (August 1993). Also, see EPA 1998a.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

- "Per the request of section 4, Request for Additional Data and Comment, please accept the enclosed information as an introduction to Biogenesis. We welcome an opportunity to open dialogue with this division of EPA to put forth our achievements in order to grant a fuller understanding in one area of current technology and its associated costs." (Biogenesis Enterprises Inc., CS2P-00180)

Response: EPA notes the comment.

- "In part C: *Proposed Approaches for Establishing treatment Standards for Hazardous Soils*, section 1. Technology-based Treatment Standards for Hazardous Soils, we agree with the Agency's position that treatment standards should not be based exclusively on incineration. Moreover, limiting innovative technology's range of treatability to "low and moderately contaminated soil" is not giving existing technologies, such as ours, as well as technologies of the future, the full measure of latitude which they appropriately deserve to treat highly contaminated soils efficiently and effectively. Regulators should recognize in promulgations that the data available to them may not accurately reflect the true state of innovative technologies currently under development, design or implementation by stating that newly developed technologies are acceptable for remediation as long as they are able to meet the new universal standards. This approach lends itself to less costly and time consuming action on the part of the Agency in having to write future promulgations that acknowledge recently developed technologies. At the same time, this approach would give the private sector an incentive to develop, improve and rapidly field innovative technologies because artificial barriers would be greatly reduced." (Biogenesis Enterprises Inc., CS2P-00180)

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[60] Inappropriate data might be derived from tests reflecting poorly designed or operated treatment or tests where EPA believes inappropriate technologies were applied. For example, tests providing data on the "immobilization" of organic constituents may demonstrate the application of inappropriate technology.

Response: As discussed previously, EPA has based its soil treatment standards on the performance capabilities of biological treatment, chemical extraction, dechlorination, soil washing, thermal desorption, and soil vapor extraction. This does not preclude the use of other treatment technologies capable of achieving the treatment limits, provided those technologies are not prohibited (e.g., impermissible dilution). Although the information available on new technologies is always changing, EPA disagrees that the data available to the Agency does not accurately reflect the state of innovative technologies. Because the rule allows the use of other technologies (other than impermissible dilution), the rule already provides incentive to develop new technologies and it is not necessary to specifically acknowledge newly developed technologies within the regulations.

EPA believes the Soil Treatment Database provides sufficient reliable and up-to-date information to justify the achievability and reasonableness of EPA's soil treatment standards. After screening the database to eliminate inappropriate data, the Agency was left with 2,541 data pairs representing treatment of eighty hazardous constituents including nine BDAT list metals.

In addition, EPA has received four comments describing the performance of innovative and conventional treatment technologies on hazardous soils. DuPont submitted bench, pilot, and full scale treatment data that described the viability of soil washing as an innovative technology for hazardous soils. The Environmental Technology Council (formerly the Hazardous Waste Treatment Council) submitted full, pilot, and bench scale treatment data from various vendors of innovative treatment technologies and provided an extensive review of EPA's soil treatment data base. The HWTC report stated that EPA may lack full-scale treatment data for several innovative or alternative technologies, but determined that the many full scale operations of these non-combustion technologies justified the achievability of soil treatment standards. USPCI's performance data described the treatment of polynuclear organics in soils via chemical oxidation followed by stabilization. Sierra Environmental Services submitted performance data regarding the treatment of carcinogenic polyaromatic hydrocarbons (cPAH) via bioremediation.

- "Overall, the proposal is forward looking and encouraging. We applaud the efforts of EPA to clarify areas of uncertainty and update those portions which are a hindrance to developing technologies. This proposal levels the playing field with respect to technology implementation, yet does not sacrifice safety of human health or environment." (Biogenesis Enterprises Inc., CS2P-00180)

Response: EPA notes the comment.

- "The attached pages (pp. 22 &23) from a paper given at the Institute of Gas Technology Symposium, November 29, 1993, contains a very relevant discussion on evaluating treatment endpoints. Figure 12 shows the results of leachate tests and earthworm toxicity tests on soil before and after treatment in a soil-water slurry reactor. Although PNAs were reduced by only 50%, the concentration of total PNAs in the leachate was reduced from over 4000 ug/l to less than 10 ug/l after treatment. Similarly, the untreated soil killed all earthworms exposed to it, while the treated soil exhibited virtually no acute toxicity to earthworms. This demonstrates that biological treatment is far more effective at reducing toxicity than total concentration analyses will indicate. If standards were set which recognized the very low potential of these treated compounds to migrate, then biological treatment would likely become a dominant treatment technology and many dormant projects would move forward." (Chevron, CS2P-00182)

Response: EPA agrees that biological treatment represents an effective means of meeting soil treatment standards. Biological processes can treat moderate to low concentration volatile and semivolatile organics to the established soil standards. Based on 245 data points, 48 data points show that volatile organics can undergo an average treatment reduction of 99% through biological treatment. 185 data points show that semivolatile organics can achieve average treatment removal efficiencies that range from 55% to 98.2%. It appears, however, that aromatic and cyclical semivolatile organics with more than five rings may achieve treatment levels at or below an average treatment efficiency of 55%. Low to moderate concentrations of organophosphorus pesticides can also undergo biotreatment and should achieve the same treatment levels achieved by semivolatile organics. The remaining 12 data points show that organochlorine pesticides achieve average treatment efficiencies that range from 16.7 to 70.2%. EPA lacks performance data on the treatment of phenoxyacetic acid pesticides, polychlorinated biphenyls (PCBs), and dioxin and furan constituents via biotreatment.

EPA disagrees with the comment that the Agency failed to consider migration tendencies in the determination of treatment levels. For contaminated soil, the Agency chose to establish technology-based soil treatment standards at levels that are achievable using a variety of common remedial technologies which destroy, remove, or immobilize substantial amounts of hazardous constituents. 58 FR 48129 (September 14, 1993). EPA believes that the treatment standards established today are within a reasonable range of levels of treatment that satisfy 3004 (m).

EPA points out, further, that the TCLP is an inappropriate performance indicator for the removal or destruction of hazardous organics. The legislative history to Section 3004 (m) -- in particular, Senator Chaffee's floor statement --makes it clear that hazardous constituents are typically to be destroyed. This issue was settled in Phase II final rule. See Response to Comments Document with regard to treatment standards applicable to PNAs in petroleum refining wastes.

- "For the four release or exposure mechanisms presented Figure 11, methods are available for estimating (i.e., calculating) the severity of potential releases or exposures. However, these methods, which derive from the relatively new discipline of risk assessment, tend to be very conservative and can significantly overestimate the severity of actual releases or exposures. Fortunately, methods are available for experimentally measuring the propensity for chemicals to be released via leaching or volatilization from soils. Similarly, bioassay tests are available for estimating the actual toxicity posed by chemicals in soils to ecological receptors.

  Figure 12 shows the results of leachate tests and earthworm toxicity tests on a soil before and after treatment in a soil-water slurry reactor. Although total PAHs were reduced by only 50% in this soil (from about 12,000 mg/kg to 6,000 mg/kg), the concentration of total PAHs in the leachate was reduced from over 4,000 ug/L before treatment to less than 10 ug/L after treatment. Based on conventional, conservative methods for estimating the release of chemicals from soil to water, concentrations on the order of 100 to 1,000 ug/L would have been expected in the treated soil. Therefore, it appears that slurry reactor treatment has greatly reduced (by more than 99%) the propensity of the soil to leach chemicals into infiltrating water, even though the same treatment reduced concentrations of total PAHs in the soil by only 50%. Similarly, the untreated soil killed all earthworms exposed to it, while the treated soil exhibited virtually no acute toxicity to earthworms (the 2.5% mortality presented in Figure 12 is within the background range of toxicity for a natural, uncontaminated solid subjected to earthworm toxicity testing). Once again, while total PAHs were reduced by only 50%, slurry reactor treatment has reduced by 95% or more the acute toxicity of the soil to earthworms, resulting in a soil that is relatively non-toxic to ecological receptors.

While methods are available for experimentally evaluating the release of chemicals via leaching and volatilization and the direct exposure of ecological receptors, no such methods currently exist for experimentally evaluating incidental ingestion or dermal contact exposures by people. For chemicals in soil to pose a risk to people via ingestion or dermal contact, these chemicals must be released from the soil when the soil is in the gastro-intestinal tract or when the soil is in contact with the skin. Since the results presented in Figure 12 suggest that the chemical remaining in treated soil is tightly bound to the soil, it may be that the chemical is not available for release if the soil is ingested or contacts the skin.

To illustrate the impact that availability can have on direct contact exposures, acceptable concentrations in soil based on incidental ingestion are calculated in Table 2. In most such calculations, it is assumed that 100% of the chemical is released from the soil (ABSs=1.0 in Table 2). If this fraction is smaller, the resulting acceptable concentration is higher. As shown in Table 2, as ABSs decreases from 1.0 to 0.1 to 0.01, the acceptable soil concentration increases from 0.1 to 1.0 to 10.0 mg/kg. Since the results in Figure 12 suggest that biological treatment might reduce the availability of chemicals in soils, such treatment could generate a soil that poses negligible risk from ingestion or dermal exposures. Since calculated risks posed by hypothetical direct contact exposures to soil often determine the treatment target for a remediation technology, this issue of availability has serious ramifications for whether or not a particular technology, this issue of availability has serious ramifications for whether or not a particular technology is judged to be acceptable. Better definition of the issues associated with determining acceptable treatment endpoints and the role of bioavailability in such determinations for treated and untreated soils is the focus of ongoing activities by GRI." (Institute of Gas Technology, CS2P.00182.a) [*This comment is an attachment with additional data related to soil.*]

Response: EPA disagrees with the comment that the risk assessment procedures significantly overstate the severity of actual releases or exposures. EPA believes that the soil standards comply with RCRA 's mandate to ensure that short- and long-term threats to human health and the environment are minimized. RCRA Section 3004(m). a site-specific risk-based variance also could be available after an appropriate demonstration.

■ "IV. <u>LDRs and other RCRA standards promote "dig and burn" alternatives for contaminated soils, when treatment and reuse may often be more appropriate. Management and remediation of contaminated groundwater is even more inflexible under the current regulatory scheme.</u>

The following cases highlight the inappropriateness of RCRA Subtitle C facility standards, permitting requirements and land disposal restrictions to remediation of contaminated media.

a. Soil Screening & Utilization

Our Billings Refinery has negotiated a soil assessment and management plan under a Consent Order with the EPA Region VIII. Soil encountered during investigation and assessment of the site will be screened in the field using a PID. If the PID readings are greater than or equal to 25 ppm, the soil will be containerized and analyzed for TCLP. If the results are less than 25 ppm, the soil will be reused on site for dikes, backfill, etc. Although composite samples from some areas have shown levels of benzene and lead, the site has not tripped the TCLP limits.

Occasionally, contaminated soils may be generated due to construction or tank upgrade activities. Some areas have failed TC for benzene. These contaminated soils are outside of the consent agreement. Under separate agreement with the State of Montana, hazardous oily soils have been excavated to background and either sent to the nearby Conoco landfarm or Environmental Services, Inc.'s Subtitle C landfill in Boise, Idaho.

Our Ponca City Refinery has voluntarily developed a similar soil management plan which has the blessing of the Oklahoma State Department of Health (OSDH). Under the plan, soils excavated due to construction or other activities at the plant are routinely tested for contamination. With the advent of the TC rule, the plant was spending over $100,000 per month on this voluntary program for TCLP analyses to determine if the soil were hazardous. Field tests and screening parameters have since been developed to minimize analytical costs associated with the soil management program.

As approved by the OSDH, the plant is now using BTEX and TPH field analyses to first screen for contamination. There is roughly a 20 to 1 correlation between total and leachable constituents. Soils with less than 10 parts per million (ppm) benzene and less than 500 ppm TPH may be reused on-site for construction purposes, e.g., backfill, dikes, grading. Soils with total benzene levels at or above 10 ppm and/or TPH levels at or above 500 ppm are considered contaminated and additional testing is performed. TCLP analyses are performed in the laboratory. Only Skinner List parameters, i.e., constituent reasonably expected to begin the refinery's waste streams are evaluated.

Analytical expense has been reduced to $2000 per month with the use of the field screening procedures. Applying the UTS to contaminated soil could escalate analytical cost severely ____ the proposed LDRs, hazardous contaminated soil must be treated for all of the hazardous constituents reasonably expected to be present. There are over 200 potential constituents of concern.

The LDRs could also force incineration of soils which could be more appropriately treated and reused on-site. a number of technologies may be used to treat petroleum contaminated soil in-situ or ex-situ, including biotreatment, soil vapor extraction, soil washing and thermal desorption.

Response: EPA does not agree that the proposed standards provide an incentive for incineration, rather than treatment and reuse. An express objective of this rule is to increase the range of appropriate treatment alternatives available to achieve the LDR treatment standards in soil to increase the likelihood that more remediations will include treatment as a component of the remedy. EPA also does not agree that the land disposal restrictions are inappropriate.

This objective could be impeded by adopting single numeric values as treatment standards, since that approach would reduce needed flexibility. Finally, as discussed previously, EPA based its soil treatment standards on the performance capabilities of biological treatment, chemical extraction, dechlorination, soil washing, thermal desorption, and soil vapor extraction. These treatment data include the combined treatment performance of steam stripping followed by Bioremediation. EPA believes that the treatment standards established today do not preclude the use of other treatment technologies capable of achieving the treatment limits, provided those technologies are not prohibited (e.g., impermissible dilution).

■ B. Innovative Biotreatment Technology

At our Ponca City Refinery, nonhazardous contaminated soils are treated using an innovative technology that combines soil vapor extraction and bioremediation. The soils are wrapped in plastic sheeting and contained on concrete pads. The innovative bioremediation technology, known as “burrito” remediation, is also a feasible and practical treatment alternative for hazardous soils; however, RCRA Subtitle C management standards and permitting requirements would prohibit the use of treated soils in on-site construction projects.

Although the burritos do not meet RCRA Subpart J Tank Standards, they are fully contained units that are designed to minimize spills, control air emissions, and collect leachate. Vent gas from the burritos is treated by carbon adsorption. The moisture content of the soil is controlled at optimum conditions for bioremediation. There are no free liquids in the burritos other than water used for moisture control. Excess moisture is drained and collected for treatment in the plant’s NPDES permitted wastewater treatment system.

Currently hazardous contaminated soils are disposed at the on-site Subtitle C landfarm or an off-site Subtitle C landfill. These disposal methods, which are not as practical or protective as in-situ treatment, would be prohibited once the organic TC LDRs take effect. We would be forced to treat the soil using more costly technologies such as incineration.

Today it costs $300-400/ton for disposal in a Subtitle C landfill. Disposal in a hazardous waste incinerator would cost $1300-1700/ton. In contrast, treatment as a nonhazardous material would be less costly. Conoco’s “burrito” technology, in-situ biodegradation or ex-situ thermal treatment could effectively treat the petroleum contaminated soils on-site for $40-70/ton depending on the soil matrix. In addition, these technologies would facilitate resource recovery through on-site reuse of soil.

Response: EPA agrees that biological treatment represents an effective means of meeting soil treatment standards. Biological processes can treat moderate to low concentration volatile and semivolatile organics to the established soil standards. Based on 245 data points, 48 data points show that volatile organics can undergo an average treatment reduction of 99% through biological treatment. 185 data points show that semivolatile organics can achieve average treatment removal efficiencies that range from 55% to 98.2%. It appears, however, that aromatic and cyclical semivolatile organics with more than five rings may achieve treatment levels at or below an average treatment efficiency of 55%. Low to moderate concentrations of organophosphorus pesticides can also undergo biotreatment and should achieve the same treatment levels achieved by semivolatile organics. The remaining 12 data points show that organochlorine pesticides achieve average treatment efficiencies that range from 16.7 to 70.2%. EPA lacks performance data on the treatment of phenoxyacetic acid pesticides, polychlorinated biphenyls (PCBs), and dioxin and furan constituents via biotreatment.

EPA based its soil treatment standards on the performance capabilities of biological treatment, chemical extraction, dechlorination, soil washing, thermal desorption, and soil vapor extraction. This does not preclude the use of other treatment technologies capable of achieving the treatment limits, provided those technologies are not prohibited (e.g., impermissible dilution)..

- D. Petroleum Product Spill and Releases.

The petroleum industry is linked by a vast network of petroleum pipelines covering the United States. DOT statistics indicate that pipeline are the safest and least expensive form of transportation available for petroleum. DOT statistics also indicate that a majority of the pipeline accidents are caused from third party "dig-ins" due to unauthorized encroachment of our easements and right-of-ways. Extensive public education systems are in place, and a toll free pipeline location service is available to the public; however, third party dig-ins are still very frequent.

Pipeline operation control centers, such as Conoco Pipeline Company's Oil Movements in Houston, Texas, have electronic detection systems in place to detect any potential release. If there is a potential leak, a pipeline across the country can be shut down in a matter of seconds. Unfortunately, these monitoring and shut-off systems can only minimize the extent of releases, not prevent them.

Such a release occurred in the rural area south of Wichita, Kansas. Approximately 42,000 gallons of unleaded gasoline were released. Most of the product was recovered. Conoco received a Consent Order from the Kansas Department of Health and Environment (KDHE) concerning the leak site.

KDHE has established notification and action levels (KNLs and KALs) for releases in the State of Kansas. The State typically negotiates site-specific levels below the KALs based on a risk assessment to determine the impact to Human Health and the Environment (HH&E). However, a large capacity expenditure would be required to achieve a clean-up below the KAL and based on the risk assessment, a reasonable alternate remediation level could be achieved that posed no major impact to the HH&E, then the alternative cleanup level could be accepted by the KDHE.

At this site, KDHE authorized the removal and transfer of the contaminated soil from the release site to Conoco property. Approximately 2,500 cubic yards of petroleum-affected soil was excavated from the leak site and hauled to the Conoco terminal. Approximately 25 soil samples were collected from the walls and bottom of the leak site to determine whether the excavation addressed the areas of contamination. Results indicated the effort was successful in remediating subsurface soil contamination. Clean backfill was placed and compacted ion the spill-response excavation.

Terminal personnel removed the topsoil and scarified and bermed an open field of Conoco property to form a containment cell in which the affected soil could be temporarily stockpiled. KDHE gave Conoco permission to spread the soil in the containment cell for bioremediation.

RCRA could have imposed inappropriate management standards and permitting requirements on the temporary land-based treatment of contaminated soil at the site. The delays and costs associated with RCRA requirements would have made the selected remedy infeasible. Since the petroleum contaminated media at many release sites will be hazardous due to leachable levels of benzene, a suspension of the TC rule for non-UST petroleum product-contaminated media and debris would be of significant benefit to our operations. Petroleum contaminated media and debris from UST sites have already been afforded relief from RCRA. It is only logical to extend this relief to non-UST sites." (Conoco, Inc., CS2P-00177)

Response: Today's final rule establishes a new treatability group--hazardous soils and establishes LDRs specifically tailored to that treatability group. Today's action resolves the portions of the April 29, 1996 and September 14, 1993 proposals that address LDR treatment standards for contaminated soils . However, other elements of April 29, 1996 proposal remain open and will be acted on in a future rulemaking.

■ "BN occurs with EPA's goal of seeking concombustive alternatives to treating contaminated media. Biological treatment (both in-and ex-situ) and low temperature thermal desorption have been proved to be effective alternatives to incineration in reducing the risk associated with site contamination. Containment, natural attenuation and degradation and institutional restrictions on future use and access to property have also proven to be effective alternatives. EPA's current approach to applying RCRA administrative and technical standards to the management of cleanup activities will discourage the application of these technologies and alternatives and will only continue to delay the clean up of sites without any appreciable enhanced environmental protection." (Burlington Northern Railroad, CS2P-00148)

Response: RCRA's administrative and technical standards do not unduly impede the use of new technologies and cleanup efforts. The standards are necessary to ensure administrative efficiency, adequate record keeping, and consistent actions and determinations . EPA does agree however that non-combustion technologies such as biological treatment and thermal desorption represent effective means of meeting the established soil treatment standards. In some instances, two or more treatment technologies may be needed to attain the treatment standards. This may be the case for hazardous constituents that are recalcitrant to biotreatment processes.

■ "Many years ago, Koppers Company pentachlorophenol-formulating operations resulted in moderate soil contamination at Time Oil's Portland, Oregon bulk terminal. Because unused (rather than used) formulations containing pentachlorophenol were apparently spilled at the terminal, the hazardous soil generated during cleanup will be classified as EPA hazardous waste number F027. See, 40 C.F.R. 261.3 (c)(2)(I). Under current land disposal restrictions, F027 waste cannot be land disposed until concentrations of the constituents of concern in the waste (including dioxins and pentachlorophenol) are reduced below 1 part per billion (ppb). 40 C.F.R. § 268.41. Incineration is the only treatment proved capable of attaining this standard.[61] See, 51 Fed. Reg. 40572, 40616 (November 7, 1986).

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[61] This fact alone illustrates the inequity of the present land disposal restrictions. Because soil at the Portland terminal is apparently contaminated by unused products containing pentachlorophenol, the soil is classified as F027 waste and must be incinerated. If the soil has been contaminated by the same products after use (e.g. by drippage

Time Oil expects to generate in excess of 3000 cubic yards of contaminated soil in cleaning up its Portland terminal. Time Oil estimates that incineration of the soil at the only incinerator currently permitted to accept F027 wastes (Coffeyville, Kansas) will cost $30 million to $43 million, including transportation costs. These costs will significantly delay Time Oil's remediation of the Portland terminal and impact Time Oil's capacity to participate in ongoing remediation of several other sites.

By contrast, the proposed alternative hazardous soil treatment standards will allow Time Oil to conduct a cost-effective and, more importantly, environmentally protective cleanup. Time Oil has evaluated biological treatment options and believes that even the most stringent of the three proposed approaches for hazardous soils potentially could be met with these destructive treatment technologies. After treatment, the soil could be replaced on site (if it no longer "contains" a hazardous waste) or disposed at a RCRA Subtitle C landfill. Time Oil estimates total treatment and disposal costs under the proposed hazardous treatment standards at $2 million to $4 million, roughly five to ten percent of the cost of incineration.

In fact, on-site treatment and replacement of the contaminated soil may well be a safer, lower risk solution than incineration. The primary constituent of concern in Time Oil's contaminated soil is pentachlorophenol from 7.4 mg/kg to 74 mg/kg. According to EPA's own risk models, these concentrations represent excess cancer risks of 1.3×10^{6} and 1.3×10^{-5}, respectively. Certainly, the standards are well within the range of acceptable risks. See, Ohio v. EPA, 997 F.2d 1520 (D.C. Cir. 1993) (risk range of 1 in 10,000 to 1 in 1,000,000 adequately protects human health); 40 C.F.R. 300.430 (e)(2)(I)(a)(2). Further, EPA's risk models assume a residential exposure, an extremely conservative exposure assumption given the strictly industrial area in which Time Oil's Portland terminal is located. Even with the exaggerated risk hypothesized by EPA's risk models, then, treatment of the contaminated soil at Time Oil's Portland terminal to the proposed hazardous treatment standards would result in soil that would be acceptable for placement in a residential setting, without subsequent disposal at a Subtitle C facility.

Alternatively, Time Oil estimates that the volume of contaminated soil it expects to generate during cleanup would fill at least 150 trucks. The risk of a fatal accident during transportation of this volume of soil to Coffeyville, Kansas for incineration is approximately 1.635×10^{-2}, nearly 20,000 times greater than the risk associated with on-site treatment and replacement of the contaminated soil.

Time Oil supports EPA's proposal to implement alternative hazardous soil standards that reflect the inherent differences between traditional hazardous wastes and hazardous constituents contained in soil. Time Oil applauds EPA's recognition that technologies appropriate for treatment of as-generated hazardous wastes may not be appropriate when those wastes may not be appropriate when those wastes are unintentionally combined with environmental media." (Time Oil Co., CS2P-00178) [Also see Chapter 27.A.]

Response: EPA notes the comment.

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from treated wood), the soil would be classified as F032 waste and could be shipped directly to a RCRA Subtitle C disposal facility with no pretreatment whatsoever. Time Oil supports EPA's efforts to introduce consistency and fairness into the land disposal restrictions.

■ “The RRR incinerator was designed specifically for the treatment of low Btu materials such as contaminated soils. a RRR is permitted, installed, and operating at RES(TX) Inc. in Deer Park, TX. Two other fixed RRR’s are permitted and planned for other at RES(NJ) Inc. in Bridgeport NJ. The RRR can also be operated as a mobile unit, however none of the mobile units have been constructed.

The Rollins Rotary Reactor is a cost effective treatment for contaminated soils and media. It has much greater flexibility in treating differing contaminants in differing soil matrices than any other innovative technology. Also it is a proven innovative technology with a permitted facility successfully operating for almost five years. Finally the level of treatment achieved meets present RCRA standards and is more protective of human health and the environment than any other innovative technology.

Attachment 1 to these comments addresses the technical issues of the RRR technology including principles of operation, treatment efficiencies, and types of wastes handled. Attachment 2 addresses capacity issues. The capacity information enclosed is for Rollins Environmental Services only and does not include the available capacity provided by other incinerators. The HWTC has conducted a survey of incinerator capacity and the results of that survey are in Appendix F of their comments to this same docket, dated 11/15/93. The management of Rollins Environmental Services strongly urges the Agency to review this capacity information. There is sufficient capacity in the incineration industry to safely handle all incinerable wastes including those presently with capacity variances.” (Rollins, CS2P-00183) **GREEN TAG**

Response: For soil contaminated with organic constituents, EPA has noted many times that, notwithstanding the fact that such soils can be burned, it is generally unsuitable or impractical from a technical standpoint to burn large volumes of mildly contaminated soil. See, For example, 55 FR at 8760 and 8761 (March 8, 1990) and 61 FR 18806-18808 (April 29, 1996). In addition, the Agency has documented potential difficulties that may arise from the combustion of soil due to soil/contaminant characteristics that affect incineration performance such as the concentrations of volatile metals, the presence of alkali salts, fine particles of soil such as clays and silts, and the ash fusion point of the contaminating waste. For example, operation of an incinerator at or near the waste ash fusion temperature can cause melting and agglomeration of inorganic salts; the loading of clays and silts in come soils may also result in high loadings of particulate matter in flue gases. *Proposed BDAT Background Document for Hazardous Soils, August 1993 and Technology Screening Guide for Treatment of CERCLA Soils and Sludges*, EPA 540/2-88/004, September 1988.

EPA’s conclusions with respect to achievability of soil treatment standards for organics in hazardous soils are based on the performance of biological treatment, chemical extraction, dechlorination, soil washing, thermal desorption, and soil vapor extraction. Other treatment technologies capable of achieving the treatment limits such as combustion are not prohibited except for those that may constitute impermissible dilution.

With regard to the issue of data for assessing treatment capacity, EPA points out that this issue is moot. The capacity period for many prohibited wastes is long over including capacity treatability variances.

■ “**EPA presents a table that identifies 36 treatment technologies under 9 different categories**

(Table 1, 58 FR 48128). This table also includes a listing of the number of bench-, pilot-, and full-scale tests having information for each treatment technology compiled in Data Summary Forms (which are associated with the soil treatability database).

DOE notes the omission of one important technology category from the EPA compilation (Table 1, 58 FR 48128). The missing category is electric separation which includes electrokinetic technology. Another database released by EPA in June of 1993, entitled "The Vendor Information System for Innovative Treatment Technologies" (VISITT 2.0) has an extensive compilation of various innovative treatment technologies, and indicates the scale of tests, contaminants treated, treatment costs, and the vendors of these technologies . a recent search of this database located listings of one bench-scale and two pilot-scale tests under this category. Currently, a bench-scale test of electrokinetic technology is being tested at the Hanford site as a means of remediating soil contaminated with the radionuclides cesium-137, europium-152 and cobalt-60. a pilot-scale electrokinetic test to remediate a chromium contaminated site at Los Alamos is being planned. Therefore, DOE suggests that electrokinetics be included as a demonstrated in-situ technology." (DOE, CS2P-00161)

Response: EPA recognizes that many innovative technologies can provide treatment capable of meeting the proposed limits for organics and metal constituents found in hazardous soils, 10xUTS levels, or the 90% reduction in total or leachable concentration of hazardous constituents present in hazardous soils. This conclusion is confirmed in the full scale and pilot testing. EPA also recognizes how a soil matrix may interfere with treatment, but believes that good engineering practices can be employed to meet the treatment objectives set by EPA's new standards. Other treatment technologies capable of achieving the treatment standards are allowed except for those that may constitute impermissible dilution.

- "The MDA has also included a description of land treatment of pesticide contaminated soil, a method being used in Minnesota to manage soil containing pesticides resulting from agricultural chemical releases. We believe that land application in certain situations is an effective, economic and environmentally safe method to manage pesticide contaminated soil. The MDA requests that the U.S. EPA review the described situations and consider implementing the three recommendations, by amending existing regulations or issuing separate policy, provided on the page of comments.

  Land treatment of pesticide contaminated soil.

  Land disposal under the LDRs includes disposal of hazardous wastes in a land treatment facility which meets RCRA facility standards. Under the present proposal the hazardous constituents in the wastes must meet the UTS for each constituent before the wastes can be placed int eh RCRA land treatment facility.

  a common treatment method utilized in Minnesota for soils containing petroleum contaminants from petroleum release sites is incorporation of the contaminated soil into the top four to six inches of native soil in a cultivated or non-cultivated field. Petroleum contaminants are degraded to non-toxic products through a combination of microbial, photolytic, chemical and plant-mediated processes.

  In addition to allowing the land application of petroleum contaminated soil, the state of Minnesota has also allowed the land application of pesticide contaminated soil. Land application provides an inexpensive and efficient treatment alternative for the remediation of pesticide contaminated soil associated with the cleanup of agricultural chemical facility sites. Other available remediation options are either unproven on a commercial basis or considerably more expensive than land application.

Land application of pesticide contaminated soil involves the use of the contaminant as a pesticide or as a treatment method for the pesticide residue in the excavated soil. Both approaches must be conducted such that there are no adverse effects on human health, livestock or the environment. The soil must be applied in accordance with the pesticide label directions which specify application rates for the receiving crop and soil type. This is consistent with the original intended use of the pesticide on crop land, as allowed by the EPA, if the pesticide contaminated soil is applied at label rates in accordance with the intended ordinary manner of use.

When the pesticide contaminated soil contains a mixture of pesticide residues, two crop safety factors are also considered in the land application proposal. Both the phytotoxic potential of the incompatible product(s) to the receiving crop and the possibility of non-labeled pesticide residue accumulation in the food product portion of the crop are evaluated and utilized in the decision to land apply soils containing pesticide residues.

In situations involving the land application of pesticide contaminated soil, the contaminated soil is thinly spread on agricultural topsoil, generally on the order of a fraction of an inch, and the contaminated soils usually subsequently incorporated into the upper six inches of topsoil. The pesticides are then degraded to non-toxic products under photolytic, microbial, chemical and plant -mediated processes.

The state of Minnesota, through the MDA, requests that the EPA consider the following situations and recommended approaches for land application of pesticide contaminated soil. At some sites the soil is contaminated with currently registered pesticides and very low levels of a canceled or suspended, previously registered, hazardous pesticide. The MDA requests that the EPA consider allowing the land application of soil containing currently registered pesticides and a canceled or suspended, previously registered, hazardous pesticide if the initial concentration of the hazardous pesticide is below the UTS for the pesticide. Additional requests for EP a consideration of land application procedures for pesticide contaminated soil follow.

a. Soil or other environmental media such as sediment or surface water is contaminated with one or more currently registered non-hazardous pesticide(s).

MDA recommendation: affirm that the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) designated state lead agency (SLA) for pesticide regulation may approve the land application of soil or other environmental media containing currently registered non-hazardous pesticides at or below label directed rates and on crops consistent with labeling in accordance with the intended ordinary manner of use.

In addition, affirm that the SLA, under FIFRA authority, may determine the concentrations of currently registered, non-hazardous pesticides in soil or other environmental media which are not of regulatory concern and may be land applied subject to SLA approval. This determination will include an evaluation of the actual and/or potential risk posed by the land application of the pesticide(s) into the environment.

b. **Soil or other environmental media is contaminated with one or more currently registered pesticide(s), one or more of which is a listed hazardous waste or is characteristically hazardous under RCRA**.

MDA recommendation: affirm that the SLA may approve the land application of pesticide contaminated soil or other environmental media at or below label application rates and on crops consistent with labeling, in accordance with the intended ordinary manner of use. The UTSs are not applicable as the soil containing hazardous pesticides will be land applied in accordance with label rates and the intended ordinary manner or use.

In addition, affirm that soil contaminated with hazardous pesticides could be recycled by land application as described above. RCRA recycling timeliness should be suspended due to the seasonal and practical restrictions inherent to the land application of pesticide contaminated soil and the exigencies of agricultural chemical site clean up activities.

c. **Soil or other environmental media is contaminated with one or more currently registered pesticide(s), and also contaminated with relatively low concentrations of canceled or suspended, previously registered, hazardous pesticides.**

MDA recommendation: affirm that the SLA may approve the land application of soil or other environmental media at or below label directed rates and on crops consistent with labeling, in accordance with the intended ordinary manner of use. In addition, affirm that the presence of low concentrations of canceled or suspended pesticides' requires an evaluation of the actual or potential risk to human health and the environment, and that the initial concentration of the hazardous constituent ;must be below the UTS for the hazardous constituent before the soil is land applied. Affirm that the presence of a canceled or suspended, previously registered hazardous pesticide does not be facto prohibit an approval for land application, if a determination of minimal risk has been reached and the initial concentration of hazardous constituent in the soil is below the UTS for that constituent.

For example, consider a hypothetical site in Minnesota where the soil is contaminated with both metolachlor, a currently registered, non-hazardous pesticide, and aldrin, a canceled, hazardous pesticide. Approximately 35 cubic yards(yd^3) of soil is contaminated and the average concentrations of metolachlor and aldrin in the soil are 20 mg/.kg and 0.061 mg/kg, respectively. The UTS for aldrin 0.0664 mg/kg.

In order to land apply the soil so that the metolachlor concentration does not exceed the lowest label application rate of 15lbs/acre, approximately 2.2 acres of land are needed, as shown below:

35 yd^3 soil x 0.0024 million lbs/yd^3 = 0.084 lbs soil

0.084 lbs soil x 20 mg/kg metolachlor = 1.68 lbs of metolachlor

Using half of the lowest label application rate of 1.5 for metolachlor on corn.

1.68 lbs metolachlor / 0.75 lbs/acre =2.2 acres

There are 0.005 lbs of aldrin in the soil, and the corresponding application rate would be 0.0023 lbs/acre of aldrin if 2.2 acres of cropland were used.

0.084 lbs soil x 0.061 mg/kg aldrin = 0.005 lbs aldrin

0.005 lbs aldrin / 2.2 acres=0.0023 lbs/acre

If 35 yd^3 of soil is land applied to 2.2 acres, the soil will be physically applied at a rate equivalent to 16 yd^3 per acre. This rate corresponds to a spreading thickness of 0.12 inches across one acre, as shown below:

16 yd^3 4840 yd^2 = 0.0033 yd or 0.12 inches vertical thickness

The applied soil would then be incorporated into the upper 3-6 inches of topsoil. If the 35 yd^3 containing 0.005 lbs of aldrin is incorporated into the upper 3 inches of 2.2 acres, the resulting aldrin concentration in the soil would be 2.27 ug/kg or 0.002 mg/kg, as shown below, assuming 2,000,000 lbs/acre for 6 inches of soil

1,000,000lbs/acre x 2.2 acres = 2,200,000 lbs soil

0.005 lbs aldrin / 2,200,000 lbs soil = 2.27×10^{-9}, 2.27 ug/kg or 0.002 mg/kg

The resulting aldrin concentration, 0.002 mg/kg, is less than 1/30 of the UTS for aldrin. If the soil is incorporated into the upper 6 inches of 2.2 acres, the resulting aldrin concentration is 0.001 mg/kg, which is less than 1/60 of the UTS for aldrin.

This example is representative of the concentrations and volumes of soil containing canceled or suspended hazardous pesticides found at agricultural chemical sites in Minnesota. It is possible to find small quantities of soil containing low concentrations of canceled or suspended hazardous pesticides, resulting from legal use or past accidental spillage, which we believe in some situations can be safely and economically managed through land application on agricultural cropland.

4. Soil or other environmental media is contaminated with canceled or suspended, previously registered, hazardous pesticides.

MDA recommendation: allow the SLA to identify concentrations and circumstances which indicate whether the residue is result of either an historical, legal use or a former production or manufacturing process. Allow the SLA to permit land application in a manner consistent with past labeling with respect to crop types and application areas, not rate, where the residue of historical, legal use or the where the initial source is unknown, proceeded the concentrations of the non-registered hazardous pesticides in the soil are below the UTS for the affected pesticides and there are no unreasonable adverse effects to human health or the environment.

5. Soil or other environmental media is contaminated with one or more currently registered non-hazardous pesticides and low concentrations of a non-pesticide

hazardous waste.

MDA recommendation: affirm that the SLA, in consultation with the Minnesota Pollution control Agency, authorized to enforce RCRA I Minnesota, ;may allow the land application of such soils if the pesticides can otherwise be land applied in accordance with label rates on appropriate crops, if the levels of the non-pesticide hazardous waste are equal to or below the UTS for that hazardous waste and if there is minimal risk to human health and the environment.

We also request that EPA consider implementing the following general recommendations to allow the continued land application of pesticide contaminated soil or other environmental media.

a. Amend FIFRA, or alternatively, issue EPA cleanup policy which specifically allows land application of pesticide contaminated soils or other environmental media, as outlined in the situations described above.

a. Develop, or allow the SLA to develop and submit to EP a for approval a table of "de minimis" concentrations of current and previously registered canceled and suspended pesticides to be utilized in determining minimum risk levels for pesticides in regard to land application. This list would be based on crop and plant phytotoxicities, typical field residue levels, food residue levels, UTS for affected pesticides and other relevant data.

b. Suspend the requirement for recycling hazardous pesticides within a certain time period for the land application of pesticide contaminated soil. Pesticide contaminated soil can be land applied only in the warmer months of the year, and additional time requirements exist for land application of particular pesticides such as atrazine, so the recycling time period requirement should be relaxed to allow land application of pesticide contaminated soil in accordance with the intended ordinary manner of use of the pesticide." (Minnesota Department of Agriculture, CS2P-00186)

Response: EPA reminds program implementors that, consistent with the rest of the land disposal restriction program, site-specific determinations that threats are minimized cannot be based on the potential safety of land disposal units, or engineered structures such as liners, caps, slurry walls or any other practice occurring after land disposal. *American Petroleum Inst. v. EPA*, 906 F.2d 729, 735-36 (D.C. Cir. 1990) (land treatment cannot be considered in determining whether threats posed by land disposal have been minimized because land treatment is a type of land disposal and section 3004 (m) requires that threats be minimized before land disposal occurs); see also S. Rep. No. 284, 98th Cong. 1st sess. at 15, stating that engineered barriers cannot be considered in assessing no-migration variances because "[artificial barriers do not provide the assurances necessary to meet the standard." This means that site-specific minimize threat determinations must be based on the inherent threats any given contaminated soil would pose. The Agency recognizes that this will have the effect of precluding site-specific minimize threat variances for remedies that rely, even in part, on capping, containment or other physical or institutional controls. In addition to being compelled by the statute, the Agency believe this approach is proper, in that it may encourage remedy choices that rely more predominantly on treatment to permanently and significantly reduce the concentrations (or mobility) of hazardous constituents in contaminated soil. The Agency has a strong and longstanding preference for these types of more permanent remedial approaches.

EPA is establishing a site-specific variance from the technology-based soil treatment standards, which can be used when treatment to concentrations of hazardous constituents greater (i.e., higher) than those specified in the soil treatment standards minimizes short- and long-term threats to human health and the environment. In this way, on a case-by-case basis, risk-based LDR treatment standards approved through a variance process could supersede the technology-based soil treatment standards.

5.G CONSTITUENT-SPECIFIC ISSUES

5.G.1 Asbestos

- "We also agree with the Agency's alternative of disposing of hazardous soil containing asbestos in leak-tight containers (per NESHAP requirements) using macroencapsulation in Subtitle c landfills." (General Motors, CS2P-00095)

- "**Special Provisions for Soil Containing Asbestos**

  If asbestos-tainted soil is containerized in leak-proof containers and the containers are then macroencapsulated, these containers should then be suitable for disposal in a Subtitle D landfill. The use of macroencapsulation coupled with containerization should render a decision that the material has been treated such that the likelihood of hazardous contamination escaping is minimal." (Westinghouse Electric Corp., CS2P-00115)

- "IN PARTICULAR REFERENCE TO RCRA SOIL STANDARDS FOR ASBESTOS DOW BELIEVES THAT EPA SHOULD NOT ATTEMPT TO REGULATE ASBESTOS-CONTAINING SOILS UNDER RCRA; CURRENT REGULATIONS UNDER OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) AND THE CLEAN AIR ACT (CAA) HAVE PROVEN EFFECTIVE AND PROTECTIVE. ACTUAL ABATEMENT PROJECT DATA SUPPORTS THIS POSITION.

  Current regulations under OSHA and CAA governing the handling and disposition of asbestos provide adequate protection for human health and the environment. OSHA regulations already provide adequate protection for personnel working with all types of asbestos products and asbestos containing materials including work involving mining, manufacturing, demolition, excavation, and landfilling, all of which may involve contaminated soil. Since OSHA standards are based on airborne concentrations of asbestos and require certain protective measures when action levels and/or excursion limits are reached, no additional protection would be gained by adding further regulatory requirements for contaminated soil. The Asbestos NESHAP provides several standards covering the handling and disposal of asbestos material. These work practices which set forth strict standards for handling asbestos until it reaches its final destination in a landfill, minimize the amount of asbestos material which can become mixed with soil outside of controlled areas. On occasion small pieces of broken transit or other asbestos containing material may become mixed with soil (as when transit is removed from a building being demolished), but are not likely to result in large amounts of fibers being released to the air. Dow has monitoring data from abatement projects which support this determination

Asbestos is a naturally occurring mineral found in soils, groundwater, and surface water. Since it is already widespread naturally, there would be no practical way to differentiate between asbestos which is naturally occurring and that which has come from asbestos containing products or materials and has become mixed with native soils. Any regulation developed would have to address this natural asbestos by devising some sort of de minimis level. Gross amounts of asbestos material will be removed from the ground and disposed of properly under current NESHAP regulations since, if not naturally occurring, they will have been generated in one of the activities (e.g., renovation, demolition, manufacturing, etc.). Even if an attempt were made to regulate soil contaminated with asbestos, the suggested treatment methods utilizing 'leak tight' containers and macroencapsulation would be very expensive and provide only a minimal amount, if any, protection to human health or the environment. The volumes of soil which could potentially be affected by such a proposed regulation would be tremendous and if required to be placed in a Subtitle C landfill would quickly deprive most RCRA facilities of valuable landfill space. Creating a new layer of regulations for little or no benefit is not warranted." (DOW, CS2P-00184)

- "**The Agency requests comments on the need for special provisions for the regulation of hazardous soil that contains asbestos. One option the Agency is considering is to collect and store hazardous soil containing asbestos in leak-tight containers, followed by macroencapsulation and disposal in a RCRA Subtitle C landfill.**

  The EPA proposal for disposal of asbestos-contaminated hazardous soil attempts to satisfy Occupational Safety and Health Act, the Clean Air Act, and RCRA. While this is a worthy goal, the proposed method of sealing hazardous soil in leak-tight containers followed by macroencapsulation and disposal may lead to additional difficulties. For instance:

  - Constituents causing the soil to be hazardous(e.g., heavy metals, organics, etc.) May cause corrosion of the containers and/or result in organic degradation within the containers (i.e., necessitating containers capable of withstanding these processes).

  - Chemicals (such as organics) causing the soil to be hazardous may decompose or react, resulting in a build up of pressure within the container over time.

DOE recommends that EPA explore these potential problems before codifying special asbestos-contaminated hazardous soil requirements." (DOE, CS2P-00161)

Response: This rule is not considering a change in substantive policy regarding treatment of asbestos. Site-specific issues can be dealt with as part of the treatment variance process. In addition, the final rule provides the option of treatment standards for contaminated soils at 10 X UTS or 90 % reduction in total concentration. There is also a risk-based variance available. These changes would seem to address the commenters' concerns.

5.G.2 EMA/MMA

- "Adoption of this flawed treatment standard would have a direct, negative impact on MPA members. First, with respect to the remediation of EMA and MMA product spills, the treatment standard would establish an unjustifiably low cleanup standard which would mandate that soils with very low, unharmful concentrations of EMA and MMA be incinerated. This result would trigger excessive, unnecessary costs; it would reflect an unjustified bias toward the use of incineration as a remedy to address contaminated soils; and it would magnify the irrationality of subjecting EMA and MMA product spills to extraordinary treatment standards, while spills of EMA and MMA wastes remain subject to RCRA generic, characteristic waste standards – standards which typically confirm that impacted soils do not qualify as RCRA hazardous wastes." (Methacrylate Producers Association, CS2P-00056)

- "These concerns are not theoretical. Regulatory authorities have been identifying permit and remediation standards for EMA and MMA. These standards, which have been based on very conservative risk-based concepts, significantly exceed the proposed universal treatment standards. To illustrate, MPA member companies have worked with State and EPA authorities to identify a cleanup standard for remediating MMA and soils that is significantly above the proposed universal treatment standards. Likewise, permit levels for MMA have been identified which exceed the proposed treatment standards. MPA will be filing an appendix to these comments which provides additional information about these cleanup levels." (Methacrylate Producers Association, CS2P-00056)

Response: The final rule provides the option of treatment standards for contaminated soils at 10 X UTS or 90 % reduction in total concentration. There is also a risk-based variance available. These changes seem to meet the commenter's concerns. In addition, nonanalyzable constituents such as metahcrylate may qualify for these hazardous soil treatment standards as discussed in the preamble and background documents (EPA 1998d).

5.G.3 Lead

■ "J. EPA Lead Strategy

The HWTC supports EPA's proposal at 58 Federal Register 48133 to integrate the Agency's Lead Strategy with the development of BDAT standards for hazardous soil. Lead contaminated soil and media represents a major environmental problem, and establishing protective LDR treatment standards will aid in preventing continued problems. The HWTC, however, does not support a total constituent standard for lead as proposed. Lead cannot be destroyed, and total constituent standards are usually more suited to constituents amenable to destruction treatment technologies. Instead, the HWTC encourages EPA to lower the existing leachate based treatment standards for all lead bearing waste, including characteristic D008 waste. The latter is an action that EPA must take also to address the Court's mandate in the Third-Third Case. Since the lead standard is being lowered for drinking water, it would be justified for EPA to lower both the characteristic hazardous threshold and the BDAT treatment standard under the TCLP test by at least a factor of 10. Data submitted to the Docket for the Third Third's LDR rule supports the achievability of the standard (i.e., see data supplied by CyanoKEM). This would provide a greater level of environmental protection, and would be a welcomed addition to EPA's Lead Strategy. In addition, a leachate standard is more practical for industry to meet than a total constituent standard." (HWTC, CS2P-00060)

Response: As noted in other responses, the treatment standards for lead (including lead-contaminated soils) do not require use of HTMR, and the standards require only reduction in mobility (using the leachate measurements from the TCLP test).

■ "**Best Demonstrated Available Technology for Lead**

PMET respectfully suggests that High Temperature Metal Recovery (HTMR) not be considered to be the Best Demonstrated Available Technology (BDAT) for lead removal and recovery from soils and industrial wastes. It is firmly believed that , by establishing revised regulations based solely upon HTMR, Resource Recovery, Recycling, and Reuse of lead will be inhibited as the result of:

13. Dramatically increased treatment costs for all lead-bearing wastes,

14. Eliminating the use of technically viable, low-cost physical separation and hydrometallurgical processes that have been demonstrated to have the capability of significantly increasing the amount of material being recycled and reducing the volume of hazardous waste being landfilled, and

15. The greatly increased volume of material for which treatment would be required.

The relative costs of lead removal and recovery by physical separation, hydrometallurgical treatment, and HTMR are estimated to be:

Physical Separation: $50 to $100 per ton (1)
Hydrometallurgical Treatment: $75 to $175 per ton (1)
High Temperature Metal Recovery: $250 to $500 per ton (1)

1. EPA/540/AR-93/517 April 1993
2. EPA/540/AR-92/019 December 1992

The above costs for Physical Separation are consistent with reported values as well as those of a physical separation process developed and successfully piloted by PMET that recovers lead-based paint chips from spent blasting abrasive. This technique, which results in 30-40% of the treated material being reused as blasting abrasive, 40-50% being suitable for beneficial reuse in the production of building products, and 10%-30% being used as smelter feed for recycling of the contained lead, recycles 100% of the spent material and eliminates the need to dispose of over 100,000 tons of material per year in hazardous waste landfills. This process is currently being commercialized by Lead Separation Technologies corporation.

The costs for Hydrometallurgical Treatment are consistent with reported values as well as those for a proprietary hydrometallurgical process developed and successfully piloted by PMET for the removal and recovery of lead from contaminated soils, foundry sand, industrial wastes, spent blasting abrasives, etc. The PMET : "Hydro Process" removes and recovers lead in the form of a metallic sponge suitable for recycling, operates without generating liquid or solid secondary wastes or noxious gaseous effluents, and produces products that easily conform to current lead regulations. This process is also being commercialized by Lead Separation Technologies corporation.

Unlike the HTMR process, which may increase the leachability of other heavy metals present in the treated waste, neither the Physical Separation Process nor the Hydrometallurgical Process alter the leaching characteristics of other metallic contaminants in the treated product.

The proposed revision in the lead regulations would adversely affect the use of both Physical Separation and Hydrometallurgical Processes that can contribute to Resource Recover, Recycling, and Reuse treated lead-bearing products. Accordingly, it is suggested that the lead limits in the new regulations be set to permit continued use of proven and effective physical and hydrometallurgical techniques." (PMET, CS2P-00096)

Response: The final treatment standards for lead do not require use of any particular technology, and should be achievable by a number of treatment technologies. As noted in other responses, the treatment standards for lead (including lead-contaminated soils) do not require use of HTMR.

> “Total Standard Versus Leachate Standard for Lead
>
> Asarco opposes the use of a total standard for lead (and for all other inorganic constituents) to set LDR treatment standards. Asarco agrees that if treatment is necessary, recovery technologies are preferable when feasible and cost-effective, but they are not always feasible for soils if metals concentrations in the soils are relatively low. Thus, if treatment is necessary to protect human health and the environment, stabilization, solidification, and immobilization are generally the most appropriate and effective treatment technologies for many metal-bearing soils. Total standards for metals are inappropriate because they fail to measure reduction in mobility, which is often the key aspect of treatment for metal-bearing soils. In addition, a total lead standard for soil is inappropriate for use in any program because such a standard does not accurately reflect risk from lead in soils for various reasons, including the low bioavailability of certain species of lead in soils, low mobility of lead in soils, and low contact rates with soil in many situations.” (Asarco, CS2P-00166)

Response: EPA is not adopting a treatment standard requiring reduction in total concentrations of lead.

1.“**EPA seeks to integrate the present rulemaking effort with the Agency’s February 21, 1991 Lead Strategy.**

> DOE supports EPA’s proposal to address lead contamination by coordinating authority across programs and by setting a total lead standard (versus the leachate standard). Such an approach would appear to be beneficial and may simplify remediation of lead contamination problems.” (DOE, CS2P-00161)

Response: EPA appreciates this support.

5.G.4 Mercury

- “The Institute believes that a treatment standard for mercury in soil of 0.009 mg/l TCLP is not supported by any BDAT. Such a treatment standard is neither realistic nor necessary. The Institute is now able to support a treatment standard identical to currently promulgated regulations for D009 wastes.” (Chlorine Institute, CS2P-00016)

Response: The final treatment standard for mercury is an order of magnitude higher than UTS (and well above 0.009 mg/l TCLP), or based on a 90 % reduction in mobility (or total concentration if a removal technology is used). The rule also provides a risk-based variance. These changes from proposal should meet the commenter's concerns.

- "Wastes such as concrete slabs or chunks, soils from excavations during construction, discarded piping, and tanks are not treatable by any of the technologies under consideration by USEPA. The materials are also low in mercury content. Since these types of materials are difficult to subject to an EP Toxicity Test, it is the general practice of member companies to conservatively classify them as D009 based on the possibility of mercury contamination." (Chlorine Institute, CS2P-00016.B)

Response: These issues appear to be dealt with already by the 1992 debris rule, and are not reopened here.

- "Following promulgation of the Land Disposal Regulations which, unfortunately, included mercury retorting as BDAT, the Chlorine Institute and its individual members began a diligent effort to develop BDAT for certain mercury bearing waste to allow time for implementation of the developed technology. Participating members applied for a case-by-case extension to the effective date for incorporation of appropriate treatment processes at various facilities across the U.S. Simultaneously, recognizing the inappropriateness of BDAT for certain debris types, a Chlorine Institute Task Group was formed to investigate alternative treatments for D009 waste. In conjunction with the research, the Chlorine Institute filed, on behalf of its members, two variance requests on August 1, 1991. One variance request was for alternative treatment for mercury contaminated debris and the second request was for alternative treatment for mercury contaminated soil.

  Subsequently, the Chlorine Institute was advised that EPA would be promulgating independent revisions to the soil and debris land disposal regulations and thus the variance applications would not likely to be addressed until such time as the proposed regulations were published, believing that such regulations for contaminated debris were published on January 9, 1992 and cannot realistically be expected to be final prior to sometime after March, 1992, Industry remains at great risk for being unable to comply with the statutory land disposal restriction date of May 8, 1992 for certain D009 mercury contaminated waste. Although current hazardous waste regulations would permit a brief period of time for storage of waste in permitted facilities, Industry remains concerned that if final regulations are delayed, final required BDAT treatment facilities will not be able to be engineered, designed, procured and constructed prior to conclusion of the brief, allowed storage time. Thus, Industry would potentially be subject to various kinds of enforcement actions for failure to meet regulatory and statutory obligations.

  This burden is even greater for mercury contaminated soils. Industry currently understands that it cannot expect final regulations for soil to be promulgated before sometime in 1993. Thus storage time and capacity becomes a more serous issue. Further, such limitations will certainly curb otherwise planned soil clean-up activities." (Chlorine Institute, CS2P-00016.D)

- "The Institute believes that a treatment standard for mercury in soil of 0.009 mg/l TCLP is not supported by any BDAT. Such a treatment standard is neither realistic nor necessary. The Institute is now able to support a treatment standard identical to currently promulgated regulations for D009 wastes." (Chlorine Institute, CS2P-00075.A)

Response: See previous response. Also, the final rule provides the option of treatment standards for contaminated soils at 10 X UTS or 90 % reduction in total concentration. There is also a risk-based variance available. These changes seem to meet the commenter's concerns. Finally, as pointed out to other commenters, the treatment capacity variance for many prohibited wastes is long over.

- "Our comments will be limited to mercury since that is the element of concern in K071 brine sludge, K106 sludges from wastewater treatment, and D009 wastes, including soil and debris.

  The mercury cell chlor alkali industry, including Pioneer, has had more than a five year history of working with USEPA to establish regulations for mercury-containing wastes which were achievable and fully protective of human health and the environment. As far back as June 16, 1988, the Chlorine Institute submitted comments to the Agency regarding K106 wastes. And, over $3 million was spent on research to develop BDAT for K106 and D009 wastes to meet Agency regulations. Many more millions have been spent constructing and operating thermal and non-thermal units to meet what we believed was BDAT per already issued and in force regulations. The above-mentioned research was necessary because EPA-promulgated BDAT was based upon mercury ore mining operations, a much different operation than using chlor alkali mercury-containing wastes.

  Specifically with regard to K071 mercury cell process brine muds, BDAT regulations have been in place for some time(since August 17, 1988) and the industry has the operations in place to meet the containing wastewater, BDAT regulations have been in place since June 1, 1990,. BDAT regulations are also in place for D009 wastes, excluding soil and debris. However, on August 18, 1992, EPA promulgated rules for newly listed wastes and hazardous debris which established, we believed, BDAT for D009 debris.

  If all of the above is true, then the regulations proposed on September 14, 1992 <u>only affect</u> D009 soil. Or, said differently, the BDAT standards already promulgated by the

Agency and being met by the industry stay in effect and the proposed regulations (9/14/93) only affect D009 soil.

With specific regard to the proposed TCLP for soil of 0.009 mg/L (9 ppb), we do not know of any BDAT which supports this number nor do we believe such a number is realistic or necessary to protect human health and the environment. In fact, we have been told by USEPA that the number comes from K061 wastes which do not even relate to or contain mercury! We recommend that the level bet 0.025 mg/l for the TCLP, with a cap one order of magnitude above that." (Pioneer, CS2P-00104)

Response: EPA has developed an alternative standard for contaminated soils in this rule which the Agency believes is achievable for all hazardous constituents, based on the information in the Background Documents for contaminated soils. The final rule provides the option of treatment standards for contaminated soils at 10 X UTS or 90 % reduction in total concentration. There is also a risk-based variance available. These changes seem to meet the commenter's concerns. References include:

EPA 1998a, <u>Soil Data Analysis: Analysis of Treatability Data for Contaminated Soil Treatment Technologies</u>, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"<u>Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds,</u>" April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"<u>Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble,</u>" April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "<u>Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation</u>," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1993a, August 1993, <u>Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil,</u> Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

■ "In summary, we urge the Agency to leave BDAT's for mercury-containing wastes as currently-promulgated and to establish the BDAT for mercury in soil as a TCLP of 0.025 mg/l, with a cap one order of magnitude above that, as was proposed by USEPA as one of the alternatives for soil." (Pioneer, CS2P-00104).

Response: See previous response.

5.G.5 Mineral Processing Wastes

- "In addressing hazardous soil issues, EPA must specifically address the unique issues presented by mining and mineral processing wastes. As discussed in these comments, these issues are both legal and technical in nature. EPA should clarify the definition of hazardous soil and its contained-in policy to ensure that soils not contaminated with Subtitle C waste (including soils with naturally occurring metals and soils contaminated with Bevill wastes) are in no case deemed hazardous waste. Furthermore, soils containing newly identified mineral processing wastes should not be subject to LDR treatment standards before LDRs are promulgated for the newly identified mineral processing wastes themselves.

Response: Other comment responses and the preamble to the final rule discuss the contained in policy and its relationship to when LDR prohibitions and treatment standards affect contaminated soils. The mineral processing wastes, and soils contaminated exclusively with these wastes, are obviously not subject to LDR treatment standards and prohibitions before the prohibitions and treatment standards are promulgated.

Asarco does not support the proposed LDR treatment standards for metal-bearing soils and does not believe that EPA's technical data adequately support them. We are particularly concerned that EPA's proposed treatment standards do not reflect the nature and variability of metal-bearing soils, including those associated with mining and mineral processing activities." (Asarco, CS2P-00166)

Response: EPA believes the standards for soils are achievable for the reasons set out in the preamble and the Background Documents for contaminated soils. References include:

EPA 1998a, <u>Soil Data Analysis: Analysis of Treatability Data for Contaminated Soil Treatment Technologies</u>, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"<u>Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds,</u>" April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"<u>Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble,</u>" April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA**

Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)

EPA 1998d, Amemorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase II, Document Number CS2P-S0599)**

> EPA must consider a recent court decision that calls into question the applicability of the Toxicity Characteristic Leaching Procedure to mining and mineral processing wastes and how the decision relates to soil containing such wastes." (Asarco, CS2P-00166)

Response: The preamble to the final rule discusses the Agency's decision to use the TCLP, and the impacts of both the Edison Electric decision referred to by the commenter, and the more recent Columbia Falls opinion.

5.G.6 PAHs

- "RETEC's performance data for PAH compounds indicates that the proposed hazardous soil standards are set too low. RETEC could not consistently achieve the universal treatment standard or the three alternative show treatment levels. Our data is confirmed by EPA's own contractor ECOVA which conducted tests as part of the SITES program.

  The enclosed table (Table 3) shows that selected RETEC sites, which are in various stages of treatability and full-scale operation, do not meet all of the individual PAH alternatives for soil, yet are projects that are successful and considered protective of health and the environment." (RETEC, CS2P-00026) [*This comment has an attachment with additional data related to soil*.]

Response: As stated in response to other comments regarding performance of biological treatment processes, the soil data base shows that this technology is among the most soil and constituent specific treatment technologies available for the treatment of hazardous soils. The technology will perform best for many compounds that are water soluble, amenable to volatilization, and amenable to co-metabolization. (EPA 1993a, EPA 1998a, EPA 1998c, EPA 1994, and cited academic literature in EPA 1998d.) For instance, many soluble and slightly soluble compounds can be treated to the regime of concentrations established today. The soil data base also shows that pentachlorophenols, less soluble polyaromatic hydrocarbons such as

PNA's with four or more rings, aromatic chlorinated pesticides, and aromatic chlorinated pesticides are resistant or recalcitrant to biodegradation processes. PCPs and four to five ring PNAs are likely to biodegrade at slower rates; our data suggests that an average treatment performance reduction ranges from 35% to 70%. This may or may not meet the 10X UTS soil treatment standards for the constituents involved. Recalcitrant constituents may require optimization of treatment processes, or additional treatment by another technology train such as chemical dechlorination (e.g., for non-volatile chlorinated organic pesticides/solvents and oily chlorinated organics such as PCB's and PCPs) or solvent extraction (e.g., for high molecular weight PNA's and chlorinated organics).

EPA's findings with regard to the performance of bioremediation treatment processes (EPA 1993a, EPA 1998a, EPA 1998b, and EPA 1998d) are consistent with other bench-, pilot-, and full-scale operation of bioremediation processes (EPA 1998a, EPA 1998d, HWTC 1993, and EPA 1994). Based on these background documents, EPA has determined that the available biotreatment performance data support the establishment of treatment standards for many soluble polar organics, volatile aliphatic chlorinated/non-halogenated organics, non-halogenated aromatic, polar organics such as ketones, alcohols, and low molecular weight PNA's.

References:

EPA 1998a, Soil Data Analysis: Soil Treatability Analysis of Treatability Data for Contaminated Soil Treatment Technologies, Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF)**

EPA 1998b, memorandum titled:"Derivation of Treatment Achievability Results for Organic Functional Groups and Types of Compounds," April 1998. from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998c, memorandum titled:"Additional Information on Treatability of Contaminated Soils as Discussed in Section VII.B.8. of Phase IV Final Rule Preamble," April 1998, from José E. Labiosa and Rita Chow of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1998d, Memorandum titled: "Extrapolation of Treatment Performance Data in the Soil Data Base Among Hazardous Constituents in Contaminated Soils and Other Implementation," April 1998, from José E. Labiosa of EPA Office of Solid Waste, Arlington, Virginia. **(RCRA Docket for Phase IV/Hazardous Soils/F-98-2P4F-FFFF.)**

EPA 1994, October 1994, Remediation Technologies: Screening Matrix and Reference Guide, Second Edition, Department of Defense/EPA Environmental Technology Council, (EPA 542/B-94/013 or **NTIS: PB 95-104 182**)

EPA 1993a, August 1993, Final/Proposed Best Demonstrated Available Technology (BDAT) Background Document for Hazardous Soil, Office of Solid Waste, Arlington, Virginia.
(RCRA Docket for Phase II, Document Number CS2P-S0599)

EPA 1997a, October 1997, Treatment Technology Performance and Cost Data for Remediation of Wood Preserving Sites, Office of Research and Development, Washington, D.C., 20460.
(**EPA/ 625/R-97/009**)

EPA 1993b, March 1993, Technology Selection Guide for Wood Treater Sites, OSWER Directive 9360.0-46FS or EPA 540-F-93-020, Office of Solid Waste and Emergency Response, Washington, D.C.

EPA 1993c, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume A: Universal Standards for Nonwastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1993d, April 1993, Final Best Demonstrated Available Technology (BDAT) Background Document for Universal Standards, Volume B: Universal Standards for Wastewater Forms of Listed Hazardous Wastes, Office of Solid Waste, Washington, D.C. 20460

EPA 1995a, November 1995, Presumptive Remedies for Soils, Sediments, and Sludges at Wood Treater Sites, OSWER Directive 9200.5-162, EPA 540/R-95/128, or NTIS: PB 95-963410.

HWTC 1993, November 1993, Evaluation of Proposed BDAT Soil and Process Treatment Technologies -- Report to the Hazardous Waste Treatment Council, ENSR Consulting and Engineering, Document Number 3393-002., submitted to EPA by the Hazardous Waste Treatment Resource Council. (See RCRA Administrative Record for Phase II rule, comment number CSP00060-E).

5.G.7 PCBs

- “EPA proposed two approaches for PCB contaminated soil treatment standards. The first approach assigns individual treatment standards for various Aroclors. This approach establishes soil treatment levels that are analytically difficult to measure.

  A.G.A. member company experience indicates that there is frequently difficulty achieving a 2 ppm detection limit with PCBs from natural gas pipelines because of the matrix interferences from sulfur compounds and other pipeline liquid constituents. When specific non-routing samples must be characterized to such low levels despite interference problems, costs for a gas chromatography/mass spectrometry can be as high as $1200 to $1500 per sample. Furthermore, since very few laboratories are set up to perform this analysis, it often takes 30 days to obtain results. Considering the number of required samples associated with site clean-ups, this approach would be unreasonable from both a cost and turn-around time perspective. Therefore, A.G.A. believes that the proposed 0.92 mg/kg and 1.8 mg/kg PCB treatment standards for soil are unacceptable.

The second approach assigns a 10 mg/kg standard final treatment standards for PCB-contaminated soils require meeting a level 10 X UTS or 90 percent reduction in total concentration. Information in the Background Document to the final rule demonstrates the achievability of these standards. (See responses to USWAG comments on these issues as well.) (The American Gas Company, CS2P-00040)

Response: The final standard can be met by a level 10 X UTS, which is higher still than the level the commenter indicates is achievable. There is also a risk-based variance available in addition to the existing variance at 40 CFR 268.44. These would appear to meet the commenter's concerns. Note also that the promulgated treatment standard for PCBs is expressed as the total concentration of PCB isomers and congeners. See 40 CFR 268.48, 268.49.

8.G.8 Petroleum-Contaminated Media

- "Removing PCS resulting from above ground tanks and pipeline from RCRA hazardous waste regulations will decrease treatment costs and increase active treatment activities. The proposed regulations would simplify on site treatment using technologies that have been proven for treating petroleum contaminated soils from UST sites." (Southwest Soil Remediation, CS2P-00109)

Response: Comment noted.

5.G.9 TC Wastes

- "TC WASTE TREATMENT STANDARDS

<u>Underlying constituents</u> (IV.A.2)

The strategy of subjecting the TC and hazardous soils to treatment for all underlying hazardous constituents causes waste analysis plan issues to be of concern. As discussed above, waste analysis plan requirements for treatment and disposal facilities need to be harmonized with the latitude provided generators to make characterization decisions. A testing burden still resides with the treater to ensure appropriate LDR standards have been met.

An even larger issue involves the Agency's authority to regulate "underlying constituents" in TC wastes. It is backhanded that the Agency is using its authority to require the identification and treatment of constituents occurring at levels below characteristic levels or that are not characteristic wastes at all . If the Agency believes they are obligated to require the treatment of listed waste constituents in TC wastes, the Agency should promulgate all the hazardous constituents on the F039 or UTS lists into § 261 as TC constituents." (Dow Chemical Company, CS2P-00067)

Response: See preamble to final rule and other comment responses which indicate why EPA adopted the final rule approach for underlying hazardous constituents in contaminated soils and for TC wastes.

5.G.10 Zinc

- "What AZA is having difficulty comprehending is how the stated intent of merely combining existing lists can be squared with such statements as the following for characteristic wastes:

  > "The treatment standards proposed for these wastes include standards for 'constituents subject to treatment' (i.e., any regulated constituent present at levels above the universal constituent-specific treatment standards…" FR at 48113.

  Similarly with respect to hazardous soil, the proposal seems to indicate that

  > "hazardous soil would be treated for each constituent subject to treatment…The Agency is proposing to define constituents subject to treatment as any regulated constituent found on Table UTS in today's proposed § 268.48, that is present at levels above the universal constituent-specific treatment standards." FR at 48123.

  AZA believes that any attempt, if one there be, to expand the proposal beyond the mere combining of existing lists-- as is EPA's expressed intent-- is improper. There has been no case made for the need to treat zinc broadly as a hazardous constituent." (AZA, CS2P-00032)

Response: Zinc is not an underlying hazardous constituent in general, but is only part of the treatment standard for K061. The K061 standard was adopted in a prior rulemaking and is not reopened by this rulemaking.

- "These regulations establish a "Universal Treatment Standard" ("UTS") for zinc and require that regulated material be treated to meet zinc's UTS under three circumstances: (I) if zinc is a listed "constituent of concern" in a hazardous waste stream; (ii) if zinc is found in soil that is hazardous (for reasons having nothing to do with zinc), the soil must be treated until both its hazardous characteristic is eliminated and the soil's zinc content meets zinc's UTS; and (iii) if a toxic characteristic waste containing zinc is managed outside the Clean Water Act ("CWA") and the Safe Drinking Water Act ("SDWA"), the zinc UTS must be met even though zinc neither caused nor exacerbated the waste's toxic characteristic.

The Independent Zinc Alloyers Association strenuously objects to these proposals because zinc is not now, and never has been considered a hazardous substance. See attachment A.

Thus, EPA's proposed UTS and the proposed regulations requiring that the UTS for zinc be met in either cleaning up hazardous soil (when zinc has nothing to do with the soil being considered hazardous) and in remediating a toxic characteristic waste is also arbitrary and capricious, and an abuse of EPA's discretion." (Independent Zinc Alloyers Association, CS2P-00082)

Response: Zinc is not an underlying hazardous constituent in general, but is only part of the treatment standard for K061. The K061 standard was adopted in a prior rulemaking and is not reopened by this rulemaking.

5.H OTHER COMMENTS RELATED TO SOIL TREATMENT

5.H.1 Notification, Certification, and Recordkeeping

- "Assuming that proposed 40 CFR 268.7(a)(10) and (a)(11) are finalized, items should be added to the table addressing the notification, certification and recordkeeping requirements for generators who determine they are managing hazardous soil that does not meet the treatment standards, or can be land disposed without further treatment as indicated by these subsections, respectively." (Department of Energy, CS2P-00043)

Response: The recordkeeping requirements associated with contaminated soil subject to the LDRs have been clarified in today's final rule.

- "Another circumstance where process knowledge would be appropriate for characterizing the waste might involve hazardous soil or debris contaminated with a listed waste having characteristics that are generally consistent and well documented." (Department of Energy, CS2P-00043)

Response: EPA agrees that it is appropriate to apply process knowledge to decisions about treatment requirements for contaminated soil. In particular, for soil contaminated by listed hazardous waste, process knowledge and knowledge of the listed waste, can be applied to determine the underlying hazardous constituents reasonable expected to be present.

- "DOE also requests that EPA reconsider its statement in the preamble to the proposed rule that, "once the [characteristically hazardous soil] is no longer hazardous, however, the only further recordkeeping and documentation required is set out in 40 CFR 268.9" (see 58 FR 48134). In many cases, contaminated soils (and other contaminated media such as surface water and groundwater) will be treated on-site or in-situ (especially now that the corrective action management unit (CAMU) option is available) as opposed to being sent to a RCRA Subtitle D facility. Furthermore, contaminated environmental media usually results from spills as opposed to a "process or operation generating the waste." As such, the notification and recordkeeping requirements under 40 CFR 268.9(d) are inappropriate for hazardous soils and other media. Therefore, given the adequacy of the notification requirements proposed under 40 CFR 268.7(e), DOE suggests that explicit language be added to 40 CFR 268.9 excluding environmental media from the requirements of that section." (Department of Energy, CS2P-00043)

Response: EPA has clarified the recordkeeping requirements associated with contaminated soil in today's final rule. The Agency does not agree that recordkeeping and notification requirements under 40 CFR 268.9(d) are, necessarily, inappropriate for contaminated soils.

5.H.2 Cost

- "G. Cost

  When all factors are considered, the cost of incineration is comparable or less than most of the innovative technologies. It is important to consider all costs when evaluating relative treatment economics. Costs such as residuals management, air and water pollution control, capital, utilities, labor, and mobilization must be factored in. The table below presents the relative costs of these technologies as extracted from the attached technology reports, for contaminated soil containing relatively the same levels of hazardous constituents.

TECHNOLOGY	TREATMENT COST ($/TON)
Biotreatment	$25 to $200
Thermal Desorption	$135 to $600
Vitrification	$40 to $1000
Soil Washing	$40 to $300 (not including residuals)
Chemical Extraction	$40 to $300
SVE	$50 to $150
Infrared Thermal Treatment	$125 to $400
Thermal Destruction	$ 300 to $600

The thermal destruction costs are fixed in this range. However the costs for the other innovative technologies can easily exceed the levels cited above, if air emission controls are required or if the residuals generated must be sent off site for BDAT treatment. It is hard to average out these factors since remedial situations vary greatly. For example, the cost of management of residuals from soil washing or chemical extraction can be as high as the cost of initial separation, if the volume of hazardous residuals generated is high. This is a commonly encountered experience.

Note that these costs do not include all factors, and assume that the innovative technology is fully compatible with the matrix and is easily amendable to the constituents of concern. Because of a wide variety of physical and chemical factors, actual treatment costs can be substantially higher for the innovative technologies, as more stages of treatment and increased residence times are required. The costs of thermal destruction cited in the table above, assumes the same level of contamination that is amendable to the innovative technologies. More highly contaminated soil, particularly with high levels of halogenated organics, may result in costs as high as $1100 per ton. These highly contaminated soils would, for the most part, not be amenable to the innovative technologies.

The above data supports the experience of many remedial contractors who have found that costs of thermal destruction is often less than or equal to many innovative technologies. For the reasons of economics, technical effectiveness, superior environmental performance and the known end point for complete treatment thermal destruction technology must continue to be viewed as BDAT treatment for soil, along with allowing for use of other technologies that meet the requisite level of soil, along with allowing for use of other technologies that meet the requisite level of performance demonstrated by the best technology. Such a policy will preserve the integrity and progress of the LDR program." (Hazardous Waste Treatment Council, CS2P-00060)

Response: On April 26, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reductions in constituent concentrations or ten times the universal treatment standard, whichever is higher. This treatment standard is being promulgated today. The economic impacts of the 90% capped by 10xUTS treatment standards are discussed in detail in the economic impact analyses prepared to support the 1996 proposal and today's final rule.

- "<u>The estimated costs for complying with the proposed rules are unrealistically low.</u>

  The recently completed National Petroleum Council Study found that the cost to refineries of current federal rules is on the order of $37 billion dollars. This is for an industry with a "book value" of only $31 billion, and a current return on investment of approximately 4%. These numbers were based upon the assumption that currently non-hazardous Solid Waste Management Units or SWMU's could be closed by being capped in placed. The report finds that:

> However, if the 187 refineries decided to close the SWMU's and remove the hazardous waste and incinerate the waste, an estimated one-time capital cost of $85.1 billion would be incurred, (see page 5-23 of Section II.)

> This is a tremendous cost to the industry, more than tripling the expenditures needed to comply with current federal rules. Notes also that this includes excavating and incinerating only the hazardous waste. If contaminated soil must also be excavated and incinerated. The report finds:

> Case B is also a contaminated soil removal case. However, the soil is assumed to be hazardous waste and, therefore, it would be incinerated offsite. The 187 refineries under the Case B assumption could incur an incremental one-time cost of about $83.59 billion over the Base Case. (See page 5-24 of the section II).

> The proposed rules will, in effect, require refineries to spend over $168 billion dollars, to remediate sites. This is much higher than the cost estimates given by EPA in the proposed rule, and it is doubtful that there are benefits which even approach such costs. Therefore, the proposed rules are unreasonable, and should be revised to reflect risk, real-world costs, and to provide some measurable benefit to society. Thank you for the opportunity to comment on these proposed rules. Please contact me at 612 437-0645 should you have any questions." (Koch Industries Inc., CS2P-00135)

Response: On April 26, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reductions in constituent concentaitons or ten times the universal treatment standard, whichever is higher. This treatment standard is being promulgated today. The economic impacts of the 90% capped by 10xUTS treatment standards are discussed in detail in the economic impact analyses prepared to support the 1996 proposal and today's final rule.

- "<u>II.   Cost Impact</u>

> Table 1 lists our facilities and routinely generated wastes which will be impacted by this rule. OxyChem estimates 7500 T/yr of wastes will impacted with a minimum incremental cost increased of $6,000,000/yr. These estimates are based on the only currently readily available technology of incineration. This analysis assumes that characteristic metal wastes and CWA wastewater treatment systems are not covered by this rule.

> Table 2 (A-D) lists impacts on forecasted remediation projects of $38,700,000 for 72,000 tons soil to meet Option 2 of the soil proposal (10x UTS). If this proposal had been in effect for the <u>past</u> two years, Table 2 (E-G) indicates costs would have

increased by $52,800,000 fro 139,000 tons to accomplish the same remediation project. Similar substantial cost impacts are predicted for future (as yet undefined) corrective action and Superfund remediations." (Occidental Chemical Corporation, CS2P-00143)

Response: On April 26, 1996, in the HWIR-Media proposal, EPA proposed a revised soil treatment standard of 90% reductions in constituent concentaitons or ten times the universal treatment standard, whichever is higher. This treatment standard is being promulgated today. The economic impacts of the 90% capped by 10xUTS treatment standards are discussed in detail in the economic impact analyses prepared to support the 1996 proposal and today's final rule.

5.H.3 Composite versus Grab Samples

- "A preference for composite samples is particularly appropriate for heterogenous wastes such as contaminated soil. Grab samples of contaminated soil can exhibit a wide range of values, from the highest value of a contaminant to non-detect. A few grab samples of contaminated soil are equally likely to understate or overstate the presence of hazardous constituents. Moreover, the compositing of samples helps to reduce sampling and analysis costs because fewer samples are required to define the waste and a broader spectrum of materials is being analyzed. Id. at nine-8. As a result, generators will typically use composite sampling.

  Regardless of the superiority of composite sampling for waste characterization, EPA has previously stated that will use grab samples to enforce the treatment standards, Fed. Reg. at 22,539 and 22,689, thereby forcing treatment and disposal facilities themselves to use grab samples in their analyses. These sampling methods are not complementary: that is, random grab samples are not an accurate check on the validity of an analysis of the whole using composite sampling. With a heterogenous waste, such as soil where the potential to find hot spots exists, different sampling methods will only lead to differing results. Thus, the use of grab samples by disposal facilities creates the potential for conflicts between the disposer and the generator who (justifiably) has used composite samples to characterize the waste. The use of grab samples by regulators could lead to disputes with even more serious consequences.

  For example, a generator using composite samples may find that contaminated soil as a whole is not a hazardous waste. Subsequent "corroborative" grab sampling by a disposal facility may reveal a "hot spot" in the soil that fails the toxicity characteristic test. The results of this grab may not be at all representative of the waste as a whole. Indeed, what has happened is that the analytic procedure required by EPA for land ban purposes has also become, in the hands of treatment and disposal facilities, a check on the generators' characterization of the waste. Thus, as a practical matter, the requirement that waste be characterized based upon a representative sample has been vitiated. EPA should eliminate this conflict by requiring composite sampling for both generators and treatment and disposal facilities, as well as by regulators." (General Electric Company, CS2P-00076)

Response: As explained at length in the preamble and I other comment responses, EPA is basing the treatment standards on performance of technologies whose performance is measured by grab sampling, and this is the appropriate means of enforcing the standards. In addition, the LDR program is designed to assure that all of the waste is treated, not just some composite portion of it. Basing compliance on grab sampling is the best means of assuring that this goal is achieved.

■ "Uniroyal Chemical questions the appropriateness of a grab sample for analysis of hazardous soil hazardous constituents. Hazardous soil generation is often the result of a spill. It is not clear how the specified sample method, "grab," would be implemented in conjunction with the proposed alternative treatment method three for hazardous soils. Will the generator be allowed to determine the sampling sites and number of grab samples appropriate for quantification? Is it anticipated that a generator of a large spill would segregate his hazardous soils into varying hazardous constituent levels for implementation of the 90% removal criteria? There is a large body of guidance from EPA on soil sampling and girding techniques. Uniroyal Chemical believes that EPA should evaluate its other programs such as the proposed Subpart S on corrective action, Superfund site management, and RCRA closure activities and consider their relevancy to the specified proposed hazardous soil sampling method." (Uniroyal Chemical Company, Inc., CS2P-00140)

Response: As explained at length in the preamble and I other comment responses, EPA is basing the treatment standards on performance of technologies whose performance is measured by grab sampling, and this is the appropriate means of enforcing the standards. In addition, the LDR program is designed to assure that all of the waste is treated, not just some composite portion of it. Basing compliance on grab sampling is the best means of assuring that this goal is achieved.

5.H.4 Treatment Standards for Residues from Soil Treatment (see Chapter 15)

Response:

■ "With reference to section 3, Treatment Standards for Residues from Soil Treatment, the Agency should be supported in its proposed amendment to RCRA section 3004(n) standards for organic and metal emissions from the combustion of hazardous waste in incinerators, boilers and industrial furnaces. The standards should be made extremely strict in order to adequately control all pollutants, especially dioxins and particulate matter." (Biogenesis Enterprise Inc., CS2P-00180)

Response: The standards for boilers and industrial furnaces are not the subject of today's final rulemaking.

- "<u>The Agency's Decision to Continue to Apply Soil Standards to Soil Treatment Residues is Wrong</u>

  Assuming the Agency inappropriately elects to adopt arbitrary standards for soils, the EPA should refrain from applying the special relaxed soil standards to any treatment residues other than the treated soil. EPA justifies its proposed standards on the claims that soil is different from other, ordinary, hazardous wastes and that soil should not be incinerated because it typically contains low or moderate levels of hazardous constituents. This rationale loses any force it might have regarding soils when applied to process wastes generated by treating soils. Such wastes are likely to contain constituents at concentrated levels compares to those evident in the original contaminated soil. Thus, residues are more likely to resemble the "hot spots" that the EPA believes should be treated to meet BDAT standards.

  Since the residues are, in effect, a process waste, there is no reason to apply any standards other than the process waste standards. The fact that a residue is " soil-like" is an insufficient basis to conclude that the soil standards apply. Other than the treated soil itself, there is no potential argument that the residue stream will be so voluminous as swallow up all of the available treatment capacity in America (an argument that has ben advanced concerning). Nor is there any rational reason of national policy to encourage retaining the concentrated residues from soil treatment at the generating site. In short, residues cease to exhibit the claimed extraordinary properties that underlie the special standards for soils. There is no reason to treat them extraordinarily.

  Furthermore, we are deeply concerned that the Agency's impenetrably confusing proclamation that "soil-like" residues will remain subject to the soil standards will have unintended harmful consequences. Reading carefully the EPA's confusing explanation, it appears that the a residue will be "soil-like" when it is "more appropriately treated by [some so-called innovative technology]. Unfortunately the answer is more confusing than the question. Moreover, it is unclear who makes the determination whether a residue is soil-like or where a residue would be more appropriately treated by an "innovative" technology. Based on the Agency's explanation, this latter determination need not be connected to the original justification for affording the soil special treatment. Thus, the residue can be manages under less protective standards provided the decision-maker can say, for example, "Gee, I really think thermal desorption is appropriate for this residue." This sort of unprincipled decision-making is completely inappropriate given Congress' and the courts' recognition that HSWA, in strict and undeniable particular, aims to assure we place public health protection above other concerns. The agency should take special note of the scope of its decision in this regard. Not all matters involving application of the proposed soil standards will be staffed by on-scene coordinators and environmental professionals well-versed in the intricacies of unwritten Agency policy. Perplexing explanations such as that in the proposal, tend to create broad, unenforceable exemptions in application. For example, based on USPCI's experience with generators applying regulations, we predict that the Agency policy will engender a spate of instances where generators have mixed (or failed to adequately separate) materials like impoundment sludge or collected product from a spill with soil to enjoy the relaxed soil standards. This will happen although the Agency never intended this result. In actual practice, questions are never as simple as characterized by the Agency when it asserts that it believes people will not mix wastes in violation of the law.

We believe that clarity is required to avoid such unintended harmful consequences. The EPA can best achieve clarity by recognizing that the soil standards are appropriate, it at all, for soils and for no other wastes. The only residue, if any, that should enjoy the soil standards is the treated soil itself." (USPCI, CS2P-00171)

Response: We believe this comment represents a mis-understanding of the 1993 proposal, however, consistent with the commenter's recommendation, in today's final rule EPA requires that non-soil treatment residuals be treated to comply with the applicable universal treatment standards in lieu of the soil treatment standards.

- "<u>Treatment Standard for Residues from Soil Treatment</u> (58 FR 48126)

All residues from treatment of hazardous soil should be subjected to the UTSs for hazardous soil.

The Agency is proposing three alternative approaches to treating hazardous soil with higher treatment levels of constituent concentrations than the UTSs. Yet the Proposed Rule states that, with the exception of "soil-like residue," any residue form the treatment of soil would be subject to meeting the UTSs. This applies to non-wastewater residue as we as hazardous wastewater residue. This is inconsistent with current regulations. 40 CFR § 261.3. The mixture and derived from rule states that wastes that are derived from the treatment of a hazardous waste are considered to be that waste. AWPI urges EPA to correct this oversight and, if soils are to be regulated as hazardous soils, require treatment of residues using the same UTS's as are required for the hazardous soils." (American Wood Preservers Institute, CS2P-00047)

Response: The Agency continues to believe that non-soil residuals from treatment of contaminated soil should be subject to the applicable universal treatment standards (rather than today's soil treatment standards). This issue is discussed, in detail, in the preamble to today's final rule.

5.H.5 Ease Burden of On-site Waste Management

- "If it is EPA's intent to require the application of LDRs to petroleum contaminated media, EPA should ease the burden of managing soil on-site. Soils are often generated in sudden and large quantities. Characterizing soil from an excavation can be time consuming and can require a large number of roll-off bins for storage. The complexities of moving, storing, and managing these bins is often prohibitive and results in disposing of non-hazardous oil as hazardous using worst case assumptions. The expected costs of such management are part of what prevents projects involving oily soil from getting off the ground.

  To alleviate this, EPA should allow longer onsite holding times (i.e. 180 days) in order to characterize and determine appropriate reuse and disposal options for contaminated soils. Also, EPA temporary storage of larger quantities of soil. The characterization area should be allowed provided that it is made with a concrete, asphalt, or plastic base to hold soil for no more than 180 days, that the soil is covered with plastic and all run-on/run-off is contained, and that there are weekly inspections for integrity. The containment building permit and construction is too onerous for many soil remediations.

  Bringing in technology for onsite treatment can be slowed by the permitting process. Onsite treatment of soils should be allowed with a minor one time permit modification negotiated with state followed by a letter of notification when technologies are brought in. Permitting requirements are otherwise too onerous to bring in on-site treatment." (The Chevron Companies, CS2P-00182)

Response: Today's final rule does not address on-site waste management requirements other than LDR treatment standards. The Agency notes that existing flexibility for on-site management of contaminated soils and other remediation waste, including opportunities for longer on-site holding times, is provided in the corrective action management unit regulations at 40 CFR 264.552.

5.I RELATIONSHIP TO OTHER PROGRAMS (see Section 27.A)

5.I.1 HWIR Roundtables

- "We should point out that the HWTC's position on soil BDAT is consistent with its position in the HWIR Roundtables.

  In the HWIR discussions, a "hot-spot/cold spot" strategy has generally been agreed upon for contaminated media. Under this strategy, highly contaminated soils ("hot spots") would be subject to BDAT treatment standards for soils; lesser contaminated soils ("cold spots") would only be subject to state regulations.

  Thus, the treatment standards for soils established by the Phase II LDR regulation would be applicable to the soil “hot spots” under HWIR. The approach to soil BDAT which we recommend above would apply to the HWIR ‘hot spots’.” (Hazardous Waste Treatment Council, CS2P-00060)

Response: EPA is not, at this time, taking action on the portion of the HWIR-Media proposal that would have established a “bright line” to distinguish between higher- and lower-risk contaminated media, including contaminated soil. The alternative soil treatment standards promulgated today will apply to all hazardous contaminated soil and will require treatment for all underlying hazardous constituents that are reasonably expected to be present in contaminated soil when such constituents are found at initial concentrations greater than ten times the universal treatment standard. If, in the future, EPA takes action to establish a bright line, EPA will address concerns regarding the relationship of the bright line to the alternative soil treatment standards and contained-in determinations, as necessary, at that time.

5.I.2 Applicability of LDRs to Soils Undergoing Remediation under RCRA or CERCLA

- “BN believes that the application of RCRA standard, including land disposal restrictions to environmental media (soils, ground water, rubble and other material related to corrective action and remediation) as proposed by the EPA is not appropriate, overly conservative and results in unnecessary delay and expense to both government and industry in our efforts to clean up contaminated sites and facilities.” (Burlington Northern Railroad, CS2P-00148)

Response: Many commenters expressed the concern that application of LDRs to remediation waste, including contaminated soil, was overly complex and would present impediments to remediation. The majority of these commenters suggested that EPA simply exempt the majority of remediation wastes, including contaminated soil, from a duty to comply with LDRs.

The Agency shares concerns that application of LDRs to hazardous remediation waste, including hazardous contaminated soil, might prove overly complex or create impediments to efficient and aggressive remedial actions. However, as discussed in the preamble to today’s rulemaking, the Agency is not, at this time, taking action on the portions of the HWIR-Media proposal which would have provided opportunities for some or all hazardous remediation waste to exit large portions of the RCRA Subtitle C system. The Agency continues to believe that legislative action is needed to address the application of RCRA Subtitle C regulations, especially LDRs, to hazardous remediation waste. If legislation is forthcoming, EPA will likely re-examine application of LDRs to hazardous remediation waste, including hazardous contaminated soil. If there is no legislation, EPA may choose to take additional regulatory action, which may include a re-examination of the application of LDRs to hazardous contaminated soils and other hazardous remediation wastes. In the meantime, EPA believes the alternative LDR treatment standards for contaminated soil promulgated today, including the site-specific, risk-based minimize threat variance, represent a significant improvement over the current practice of applying the treatment standards developed for pure industrial hazardous waste.

- “EPA should clarify that excavating, staging and returning soil to that excavation is not “management” and does not trigger the LDRs or other RCRA requirements.” (Rohm and Haas Company, CS2P-00114)

- "Rohm and Haas operates several plants that have been heavy manufacturing sites for many years. Some of the soils at these plants may have been contaminated from past manufacturing operations by chemicals that are listed hazardous waste when disposed, or may be contaminated at levels above the toxicity characteristic. The contamination may also be associated with a waste management facility, such as a surface impoundment or container storage area. Rohm and Haas has programs in place at its facilities to investigate and manage the soils and groundwater in a manner that compiles with the law and makes good environmental and engineering sense.

  However, Rohm and Haas often must temporarily excavate contaminated soils to reach underground infrastructure for maintenance or construction. The most sensible and environmentally protective management protocol would be to stage the excavated soils near the work site in piles or bulk containers, protected from precipitation by a liner and cover. Most of the soil could then be returned to the excavation as backfill where the peripheral soils are of a similar contamination. Excess soils would be managed in accordance with RCRA. The alternative of treating and dispensing of all the excavated contaminated soil and backfilling with clean soil simply makes no sense where the surrounding soil is contaminated. The new, clean backfill will simply become contaminated, which adds to the ultimate volume of contaminated soil that must be remediated and landfilled.

  Rohm and Haas seeks clarification that the excavation and return of contaminated soils as outlined above does not constitute "management" triggering the Land Disposal Restrictions or other RCRA requirements.

  EPA addressed a similar situation in a letter from Sylvia Lowrance to Douglas H. Green dated June 11, 1992. A copy of that letter is attached hereto as Appendix B. There, EPA stated that the excavation does not "produce" hazardous waste, and therefore RCRA requirements do not apply. EPA should clarify that this interpretation is not limited to excavations conducted on public roadways, as implied on the June 11 letter, but also applies to excavation and backfilling in manufacturing facilities." (Rohm and Haas Company, CS2P-00114)

Response: EPA agrees that, under the area of contamination policy, provided excavation, staging, and replacement activities occur within an area of contamination, LDRs and other RCRA requirements are not triggered. The area of contamination policy is not affected by today's rulemaking. To reduce confusion over this issue the preamble to today's final rule includes a detailed discussion of when LDRs apply to contaminated soil, including a discussion of the area of contamination policy.

- "APPLICABILITY OF RCRA LDRs TO CONTAMINATED MEDIA

EPA's proposed hazardous soil treatment standards "would apply to soils contaminated with listed hazardous wastes, soils displaying the toxicity characteristic, and soils displaying the characteristic of ignitability, corrosivity, or reactivity." As EPA explains, such soil "can be generated from a wide variety of activities, including remedial actions at Superfund and RCRA corrective action sites, and spills at manufacturing sites."

EPA should not apply LDRs at sites begin addressed under Superfund or other federal or state authorities or oversight. These programs are specifically designed to protect human health and the environment, and EPA should defer to these programs for making decisions about soil management. Applying RCRA LDRs will unnecessarily add to the costs of remedial actions and the requirement to meet the LDR treatment standards - regardless of whether they make sense in a specific remediation situation - will hinder remediation. Soil management may take up a larger portion of total site remediation funds than it generates in corresponding benefits, and certain options (e.g., those involving movement of soil) may be rendered infeasible if LDR treatment standards are imposed. The end result will be detrimental rather than beneficial to human health and the environment. EPA also should ensure that LDRs are not applied in a manner that would delay cleanup of spills at operating sites.

In promulgating the RCRA toxicity characteristics (TC) rule, EPA deferred the applicability of the rule to contaminated media and debris generated during underground storage tank (UST) corrective actions. One of the main reasons EPA took this action was that imposition of Subtitle C requirements had the potential to impede UST cleanups. EPA has since proposed to exempt contaminated media generated during UST corrective actions from the TC." EPA can draw a similar conclusion with respect to application of the LDRs to Superfund sites and other remediation sites; the RCRA requirements have the potential to interfere with remediation. For example, remediation could be hindered if the economic feasibility of alternatives is affected due to added costs to meet LDR treatment standards. In the proposal to exempt media UST contaminated media from the TC, EPA stated that it believes state agencies are currently managing UST-contaminated media in manner that protects human health and the environment, and that it is therefore unnecessary to subject these materials to Subtitle C control. Similarly, soils from sites being remediated with the oversight of relevant authorities are being managed in a manner protective of human health and the environment, EPA should allow these remediation activities to proceed under the relevant authorities without imposing generic LDR treatment standards under RCRA.

We encourage EPA to reconsider the issues of applicability of LDRs to Superfund sites and other remediation sites and spill cleanups being addressed under other federal and state authority or oversight. The HWTR process presents an opportunity for EPA to do this. At the very least, therefore, EPA should suspend the applicability of LDRs for hazardous soil at such sites while the HWIR process continues." (Asarco, CS2P-

00166)

- "Asarco believes that EPA should not apply RCRA LDRs to any soils at Superfund sites or other remediation sites and/or spill cleanups being managed under the auspices of other federal or state authorities or oversight. Instead, soil management decisions should be made on a site-specific basis by the authorities overseeing remediation or cleanup activities at the site. This will maximize benefits to human health and the environment by promoting feasible decisions made with a particular knowledge of the conditions at a specific site. At a minimum, EPA should suspend applicability of the RCRA LDRs for hazardous soils at Superfund and other sites being addressed under federal or state authorities or oversight while it continues to address the issue of soil management through the HWIR process." (Asarco, CS2P-00166)

Response: Many commenters expressed the concern that application of LDRs to remediation waste, including contaminated soil, was overly complex and would present impediments to remediation. The majority of these commenters suggested that EPA simply exempt the majority of remediation wastes, including contaminated soil, from a duty to comply with LDRs.

The Agency shares concerns that application of LDRs to hazardous remediation waste, including hazardous contaminated soil, might prove overly complex or create impediments to efficient and aggressive remedial actions. However, as discussed in the preamble to today's rulemaking, the Agency is not, at this time, taking action on the portions of the HWIR-Media proposal which would have provided opportunities for some or all hazardous remediation waste to exit large portions of the RCRA Subtitle C system. The Agency continues to believe that legislative action is needed to address the application of RCRA Subtitle C regulations, especially LDRs, to hazardous remediation waste. If legislation is forthcoming, EPA will likely re-examine application of LDRs to hazardous remediation waste, including hazardous contaminated soil. If there is not legislation, EPA may choose to take additional regulatory action, which may include a re-examination of the application of LDRs to hazardous contaminated soils and other hazardous remediation wastes. In the meantime, EPA believes the alternative LDR treatment standards for contaminated soil promulgated today, including the site-specific, risk-based minimize threat variance, represent a significant improvement over the current practice of applying the treatment standards developed for pure industrial hazardous waste.

- "The structure and rigidity of RCRA Subtitle C management standards and Land Disposal Restrictions are not intended nor suitable for remedial actions. LDRs and other RCRA standards promote "dig and burn" alternatives for contaminated soils, when treatment and reuse may often be more appropriate. Management and remediation of contaminated groundwater is even more flexible under the current regulatory scheme." (Conoco, Inc., CS2P-00177)

- "**The structure and rigidity of RCRA Subtitle C management standards and Land Disposal Restrictions are not intended nor suitable for remedial actions.**

  Conoco believes that remedial actions can best be achieved by tailoring alternatives to site specific conditions. The decision to remediate and the degree to which remediation is required should be based on site specific conditions and real risks to human health and the environment. Most remediation programs of today are conducted under State and/or Federal oversight and typically incorporate public review and comment. Such scrutiny assures that appropriate remedial actions will occur.

In contrast the current Land Disposal Restrictions program is a technology-based program. The BDAT treatment standards, whether expressed as concentrations in the waste, concentrations in the waste extract or as specific technologies, are primarily based on combustion technology. This scenario does not offer the flexibility required to effectively achieve the goals of today's remedial programs. EPA is working vigorously to resolve the unique issues surrounding remediation of contaminated media through a number of ongoing activities including the HWIR Roundtable, the New York Petition and petroleum contaminated media exclusion, and RCRA Corrective Action. EPA should defer land disposal restrictions for contaminated soil and other media until EPA has resolved these overlapping issues." (Conoco, Inc., CS2P-00177)

Response: Many commenters expressed the concern that application of LDRs to remediation waste, including contaminated soil, was overly complex and would present impediments to remediation. The majority of these commenters suggested that EPA simply exempt the majority of remediation wastes, including contaminated soil, from a duty to comply with LDRs.

The Agency shares concerns that application of LDRs to hazardous remediation waste, including hazardous contaminated soil, might prove overly complex or create impediments to efficient and aggressive remedial actions. However, as discussed in the preamble to today's rulemaking, the Agency is not, at this time, taking action on the portions of the HWIR-Media proposal which would have provided opportunities for some or all hazardous remediation waste to exit large portions of the RCRA Subtitle C system. The Agency continues to believe that legislative action is needed to address the application of RCRA Subtitle C regulations, especially LDRs, to hazardous remediation waste. If legislation is forthcoming, EPA will likely re-examine application of LDRs to hazardous remediation waste, including hazardous contaminated soil. If there is not legislation, EPA may choose to take additional regulatory action, which may include a re-examination of the application of LDRs to hazardous contaminated soils and other hazardous remediation wastes. In the meantime, EPA believes the alternative LDR treatment standards for contaminated soil promulgated today, including the site-specific, risk-based minimize threat variance, represent a significant improvement over the current practice of applying the treatment standards developed for pure industrial hazardous waste.

- **"CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA)**

How will EPA address background concentrations for naturally occurring constituents during cleanup activities?

A description of action between UTS and cleanup activities involving soil removal should be included in the final rule. Since the UTS includes contaminants such as metals that can be naturally occurring, will a facility have to treat the soil below background concentrations for the naturally occurring constituents? If so, this should be addressed. EPA should also describe what would constitute adequate documentation for background evaluations." (Westinghouse Electric Corp., CS2P-00115)

Response: In consideration of this and other comments, EPA has concluded that treatment to comply with the soil treatment standards should not be required if constituent concentrations fall below naturally occurring background concentrations, provided the soil will continue to be managed on site or in an area with similar natural background concentrations. If soil will be sent for land disposal off-site, compliance with the alternative soil treatment standards is required, since the Agency believes that natural background concentrations on-site will not automatically correspond to natural background concentrations at a remote land disposal facility.

The Agency notes that natural background concentrations are constituent concentrations that are present in environmental media which has not been influenced by human activities or releases. Since these constituent concentrations are present absent human influence and EPA has determined that soil (like other environmental media) is not, of itself, a waste but may be regulated as hazardous waste under RCRA only when it contains (or contained) waste, EPA is not convinced the Agency would have the authority to require compliance with LDR treatment standards when constituent concentrations fall below background concentrations even if it felt compelled to do so. (Of course, such constituents could be regulated as hazardous constituents under cleanup authorities, including RCRA corrective action and other authorities.)

Since background concentrations may vary across geogographic areas, and to ensure that the LDR soil treatment standards will only be capped at background where appropriate, EPA will require that individuals who wish to cap LDR treatment at natural background concentrations apply for and receive an LDR treatment variance. EPA will presume that when the soil treatment standards would require treatment to concentrations that are less than natural background, such a variance will be appropriate, based on the finding that it is inappropriate, for contaminated soil, to require treatment to concentrations less than natural background concentrations.

- "However, the application of the RCRA regulations to the management of environmental media contaminated with hazardous wastes has not been successful. In fact EPA's management of the CERCLA program and the implementation of the RCRA corrective action program have both been stymied by EPA's current approach to applying to RCRA regulations of the one time generation of contaminated media related to clean up efforts.

  EPA recognizes that the nature of contaminated media is different from the hazardous wastes with which they are contaminated. The risks associated with the contaminated media are significantly lower than the risks associated with the hazardous waste because of lower toxicity and mobility and the one time nature of the generation. BN's waste minimization efforts are not effective when applied to cleanup-related contaminated media. BN has no pollution prevention choices for the management of these wastes since the clean up activities are being driven by the same environment regulatory programs that encourage and force waste minimization. The past practices that caused the contamination are not controllable. For all of the above reasons, BN believes the EPA's current application of RCRA and its related land disposal restrictions to contaminated media is fruitless and the agency should look for other alternatives to insure that contaminated media are managed in a protective manner.

BN believes that, from risk management perspective, the continued land disposal of contaminated media (soils) into highly engineered and regulated hazardous waste land disposal facilities should not be subjected to the land disposal restrictions. The hazardous waste contained in the environmental media is typically at very low concentrations and the minimum technical requirements (double liners and leachate collection) that are applied to these facilities eliminate any risk associated with their land disposal. The requirement to 1) treat contaminated media to very low levels that are highly protective without any further containment and then 2) place them in a facility which itself is designed to eliminate any possibility of migration, is overly conservative and is "beyond the point at which there is no 'threat' to man or nature." More importantly the land disposal restrictions were designed to discourage the land disposal of hazardous waste and to encourage waste minimization and other treatment alternatives. EPA and industry both agree that those management alternatives are not applicable to the one time management of remediation related contaminated media and that the technologies (incineration) normally identified for BDAT are not applicable to contaminated media." (Burlington Northern Railroad, CS2P-00148)

Response: Many commenters expressed the concern that application of LDRs to remediation waste, including contaminated soil, was overly complex and would present impediments to remediation. The majority of these commenters suggested that EPA simply exempt the majority of remediation wastes, including contaminated soil, from a duty to comply with LDRs.

The Agency shares concerns that application of LDRs to hazardous remediation waste, including hazardous contaminated soil, might prove overly complex or create impediments to efficient and aggressive remedial actions. However, as discussed in the preamble to today's rulemaking, the Agency is not, at this time, taking action on the portions of the HWIR-Media proposal which would have provided opportunities for some or all hazardous remediation waste to exit large portions of the RCRA Subtitle C system. The Agency continues to believe that legislative action is needed to address the application of RCRA Subtitle C regulations, especially LDRs, to hazardous remediation waste. If legislation is forthcoming, EPA will likely re-examine application of LDRs to hazardous remediation waste, including hazardous contaminated soil. If there is not legislation, EPA may choose to take additional regulatory action, which may include a re-examination of the application of LDRs to hazardous contaminated soils and other hazardous remediation wastes. In the meantime, EPA believes the alternative LDR treatment standards for contaminated soil promulgated today, including the site-specific, risk-based minimize threat variance, represent a significant improvement over the current practice of applying the treatment standards developed for pure industrial hazardous waste.

- "Asarco is interested in the proposed LDR rulemaking and any other EPA actions that would affect management of soil at Superfund sites, RCRA corrective action sites, remediation sites being addressed under similar state authorities or state oversight, voluntary remediation activities, and spill cleanup activities. Asarco's objective in this respect is that any containment, treatment, or other necessary action related to the management of soils be accomplished in an expeditious and cost-effective manner that protects human health and the environment. One of Asarco's critical interests in this matter is that any related EPA decisions take into consideration the unique nature (from both legal and technical standpoints) of soils at mining and mineral processing sites or associated with mineral processing activities. Consistent with these general positions, Asarco offers a number of specific comments on EPA's LDR proposal for hazardous soil in this document, which are summarized briefly here:

> EPA should not apply RCRA LDRs to soils at sites being remediated under other federal or state authorities or oversight (particularly Superfund); decisions about how to manage soils at these sites can and should be made on a site-specific basis. EPA should suspend applicability of the LDRs to soils while HWIR efforts proceed." (ASARCO, CS2P-00166)

Response: Many commenters expressed the concern that application of LDRs to remediation waste, including contaminated soil, was overly complex and would present impediments to remediation. The majority of these commenters suggested that EPA simply exempt the majority of remediation wastes, including contaminated soil, from a duty to comply with LDRs.

The Agency shares concerns that application of LDRs to hazardous remediation waste, including hazardous contaminated soil, might prove overly complex or create impediments to efficient and aggressive remedial actions. However, as discussed in the preamble to today's rulemaking, the Agency is not, at this time, taking action on the portions of the HWIR-Media proposal which would have provided opportunities for some or all hazardous remediation waste to exit large portions of the RCRA Subtitle C system. The Agency continues to believe that legislative action is needed to address the application of RCRA Subtitle C regulations, especially LDRs, to hazardous remediation waste. If legislation is forthcoming, EPA will likely re-examine application of LDRs to hazardous remediation waste, including hazardous contaminated soil. If there is not legislation, EPA may choose to take additional regulatory action, which may include a re-examination of the application of LDRs to hazardous contaminated soils and other hazardous remediation wastes. In the meantime, EPA believes the alternative LDR treatment standards for contaminated soil promulgated today, including the site-specific, risk-based minimize threat variance, represent a significant improvement over the current practice of applying the treatment standards developed for pure industrial hazardous waste.

5.I.3 Corrective Action Management Units (see Chapter 17)

- "**<u>EPA Should Extend the CAMU Concept to Voluntary Corrective Actions.</u>**

Voluntary remediations are fast becoming the preferred procedure for remediation of older industrial sites and sites undergoing expansion, renovation, or installation of new processes. Many of the sites that use or would use voluntary remediations are not currently subject to RCRA corrective action nor would they be subject to CERCLA remediation. EPA has asked industry as a whole to voluntarily remediate sites and has offered either through state agencies or EPA to oversee these sites. Many states, such as Illinois, have good existing voluntary remediation programs that encourage sites to clean up. The major difference between a voluntary remediation and one under RCRA corrective action is the flexibility afforded in the voluntary remediation and the timetable allowed for the clean-up. Voluntary remediations often use more innovative methods and technology. Most states closely monitor the voluntary remediations. Since there is little if any technological or methodological difference between the voluntary and enforced remediations or corrective action, EPA should continue to allow as much flexibility in the rules as possible to encourage voluntary remediations. Therefore, the CAMU concept should be extended to voluntary remediations that are conducted under the auspices of a state or federal program." (Rohm & Haas, CS2P-00114)

Response: The corrective action management unit regulations are not the subject of today's rulemaking. The existing CAMU regulations are not affected by today's rulemaking and continue, as appropriate, to apply to management of remediation waste. The Agency notes that there is no prohibition on approval of a CAMU at a voluntary cleanup site; however, the approval would have to be granted by EPA or an authorized state.

- "EPA should address hazardous remediation wastes, as defined in the Corrective Action Management Unit (CAMU) rule, rather than simply hazardous soils, in HWIR and its treatment goals." (DuPont, CS2P-L0003)

- "There is no argument that materials which are clearly as-generated wastes which have been managed with the intent that waste management rules should apply(process sludges in lined RCRA impoundments, for example, or containerized wastes) should stay in the full RCRA waste system. However, a line can and should be drawn between these materials and these materials and those that really are "remediation wastes."

  We encourage EPA to have the HWIR process and its treatment requirements apply to remediation wastes as defined in the CAMU rule to better reflect the reality of remedial activities and ensure that the tremendous efforts put into HWIR actually yield meaningful reform." (DuPont, CS2P-L0003)

Response: In response to comments such as these, EPA deferred a final decision on soil treatment standards to the HWIR-Media process's larger evaluation of application of RCRA Subtitle C requirements to remediation wastes.

5.I.4 Voluntary Cleanups

- "**Relationship to Other Regulations and Programs (page 48131):** GM agrees that the existing treatment standards that apply to soil containing hazardous waste are a disincentive to voluntary cleanups. We also agree that the proposed standards are set at somewhat more reasonable levels and allow some flexibility in deciding which treatment technology(s) to utilize, which should have a beneficial effect on voluntary cleanups." (GM, CS2P-00095)

Response: EPA appreciates this support of soil treatment standards.

- "We do not believe that the current proposal will remove as many disincentives to voluntary cleanup as it creates. While the flexibility with respect to cleanup technologies is welcome, the subjection of hazardous soil to universal treatment standards (for potentially the entire list of hazardous constituents subject to treatment) is very different from the prior position taken by the agency. That is, the contained-in principle had indicated that contaminated soil would need to be managed as hazardous waste until it was determined that it no longer contained hazardous waste, no longer exhibited a characteristic, or was delisted. See, 57 Federal Register 986, third column (1/9/92). Thus, when soil exhibited a toxicity characteristic, and was treated to no longer exhibit that characteristic, then the soil was no longer required to be managed as hazardous. Further, the current proposal does not allow the soil to exit the hazardous waste regulations, and requires treatment for all UTS hazardous constituents, calling into question the adequacy of prior estimates regarding hazardous soil to be treated and the adequacy of available treatment capacity." (Boeing, CS2P-00029)

Response: Many commenters expressed the concern that application of LDRs to remediation waste, including contaminated soil, was overly complex and would present impediments to remediation. The majority of these commenters suggested that EPA simply exempt the majority of remediation wastes, including contaminated soil, from a duty to comply with LDRs.

The Agency shares concerns that application of LDRs to hazardous remediation waste, including hazardous contaminated soil, might prove overly complex or create impediments to efficient and aggressive remedial actions. However, as discussed in the preamble to today's rulemaking, the Agency is not, at this time, taking action on the portions of the HWIR-Media proposal which would have provided opportunities for some or all hazardous remediation waste to exit large portions of the RCRA Subtitle C system. The Agency continues to believe that legislative action is needed to address the application of RCRA Subtitle C regulations, especially LDRs, to hazardous remediation waste. If legislation is forthcoming, EPA will likely re-examine application of LDRs to hazardous remediation waste, including hazardous contaminated soil. If there is not legislation, EPA may choose to take additional regulatory action, which may include a re-examination of the application of LDRs to hazardous contaminated soils and other hazardous remediation wastes. In the meantime, EPA believes the alternative LDR treatment standards for contaminated soil promulgated today, including the site-specific, risk-based minimize threat variance, represent a significant improvement over the current practice of applying the treatment standards developed for pure industrial hazardous waste.

- "H. Effect on Voluntary Clean-ups

The proposed alternative BDAT standards for soil and the contained-in policy are needed by the regulated community as quickly as possible. The HWTC was extremely disappointed to hear of EPA's decision to extend the comment period for the soil portion of the rule until March 1994. The reforms embodied in the proposed Phase II LDR rule are needed desperately to promote more remedial action and voluntary clean-ups. The soil standards are needed now, but in no event should EPA delay past June 1994 in promulgating alternative BDAT and a contained-in policy for contaminated soil." (Hazardous Waste Treatment Council, CS2P-00060)

Response: EPA appreciates this support of the soil treatment standard. Despite these comments the Agency choose, in 1994, to defer decisions about promulgating soil treatment standards and the contained-in policy to the HWIR-Media rulemaking process.

- Provision must be made for self-implementing requirements for cleaning up small spills. Currently, even minor spills require months of negotiation before clean-up can begin. This does not benefit the environment. (Occidental Chemical Corporation, CS2P-00143)

Response: The soil treatment standards will apply when soil contaminated by spills is subject to LDRs. The treatment standards are, like other LDR treatment standards, self-implementing and do not require negotiation (or Agency approval) before they can be applied.

5.I.5 Public Participation (see Section 16.D)

- "<u>The Proposed Soil Standards Jeopardize Important Public Participation Mechanisms Under CERCLA and Place States and Citizens at a Disadvantage in Selecting Remedies</u>

  The EPA notes that its policy decision to relax standards to accommodate non-incineration technologies is reasonable in view of its 'determination that combustion is not always the Best Demonstrated Available Technology for many soils.' Proposal, at 48,125. In support of that proposition, the Agency cites 55 Fed. Reg. 8,666, 8,761 (1990). The discussion at the cited reference, however, fails to support the above-quoted proposition. The cited passage relates to treatability requests considered at CERCLA response actions. In that context, the EPA determined for administrative reasons that the BDAT standards based on incineration are presumed to be inappropriate to soils unless a showing is made that they are appropriate and that a party seeking such a treatability variance need only justify his choice of alternative technology and its ability to meet the Superfund 6A guidance.

  The EPA did not establish or even claim that incineration was not the best demonstrated available treatment technology for soils. To USPCI's knowledge, the EPA has never done so. The Agency action in the cited passage is more appropriately characterized as making the administrative determination that soils often qualify for treatability variances due to site-specific factors and that, therefore, the EPA would presume the 6A guidance provided appropriate variance levels to be established in CERCLA ROD process. Indeed, the cited passage proceeds precisely on the premise that incineration-based BDAT standards are appropriate. Had the EPA made any other determination in the cite rulemaking, there would, of course, have been no need to apply the § 268.44(h) treatability variance procedure.

Correcting the EPA's misapprehension of its own earlier rule is not merely an exercise in "nit-picking". It is vitally important. The treatability variances discussed in that rule are considered in the process of developing the CERCLA record of decision for a particular site. The ROD development process includes substantial provisions for state officials and locally affected people to become involved in the remedy selection process and to obtain information about the degree of public health protection they can expect from the remedy.

The proposed soil standards effectively remove this public participation mechanism from the CERCLA process for soils at response sites. Be adopting either proposed regulatory option for soils, the EPA will render the lax final standards an ARAR at CERCLA response actions nationwide. Because the new, lax treatment standards will be applicable as a matter of federal law through HSWA, the EPA will be under no real burden to pay attention to any state or local complaint. There will be no need to consider a treatability variance. Consequently, there will be no need to entertain discussion about the clean-up levels appropriate at a particular site. Nor will there even be much of a need to consider whether an on-site or off-site remedy is appropriate for soils.

In practical effect, the new lax soil standards will amount to a national determination that treatment for soils to levels that minimize threats to human health and the environment is no appropriate at CERCLA sites (or for that matter, corrective action sites).[62] In practical effect, the new lax soil standards constitute a nationally applicable treatability variance for soils. In practical effect, the new lax standards transform determinations that were once made based on site specific factors[63] to a nationwide, advance-decision that site-specific factors exist everywhere or, in the alternative, that site-specific factors are not an appropriate consideration. This result is curious indeed in view of the continuing Agency claims that all decision-making should be site-

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[62] The Agency cannot possibly claim, except through the most contorted view of reality, that treatment standards ten times greater than the levels determined to minimize threats are, for soils, the minimize threat levels.

[63] It is important to note that , even under the EPA policy statement presuming 6A guidelines to be appropriate for soils, opportunity existed to overcome the presumption by showing that a more protective standard is achievable and appropriate. This opportunity disappears once the new lax soil standards are promulgated.

specific.

Once established as federal law ARARs, the EPA will gain the ability to force-feed an on-site remedy incorporating less than protective standards at any response action nationwide. This surely was not the intention Congress had in mind when it amended CERCLA to compel EPA to adhere to federal, state, and local laws. Because the final soil standards will be promulgated under HSWA, it is far from clear that a state or locality could enforce its interests in a protective remedy by adopting its own law. Although the EPA proposes, in effect, to turn the entire CERCLA ROD process on its head in the LDR context, the preamble (which otherwise refers copiously to CERCLA and corrective action) fails to devote a single word of discussion to the point. To the extent the Agency was unaware of this probable effect of the Phase II soil rule, the oversight should be corrected through a supplementary proposed rulemaking. We note that the oversight, if any, would not have occurred had the Agency remained focused on HSWA's mandate to establish treatment standards that minimize threats to human health and the environment and remained true to the BDAT methodology in favor of the Proposal's regulation-by-guess methodology. Whether or not the Agency anticipated this probable effect on CERCLA, we believe that the proposed lax standards represent an extraordinarily poor policy choice." (USPCI, CS2P-00171)

Response: As discussed in detail in the preamble to today's final rule, EPA has found that the soil treatment standards minimize threats within the meaning of RCRA Section 3004(m) considering the distinct treatability issues posed by soil and the distinct policy issues posed by the remediation context under which most contaminated soil is managed. The Agency is not, therefore, concerned over their potential application as an ARAR at CERCLA sites. The public participation associated with CERCLA remedial actions is not affected by today's rulemaking. To the extent that the soil treatment standards are applied to contaminated soil at CERCLA sites, this application will be addressed in proposed plans (and RODs) and subject to public review and comment.

The Agency notes that the soil treatment standards, like any LDR treatment standards are not and should not be used as cleanup levels.

5.I.6 Radioactive Mixed Wastes (see Section 27.A)

- "Treatment of analyzable constituents in soils should provide adequate treatment of non-analyzable constituents as well.

  Under the proposed rule, EPA intends to subject mixed radioactive hazardous soil to the proposed treatment standards for hazardous soil (in addition to any regulation of that material under AEA), rather than to the treatment standards for the contaminating wastes. This includes soil contaminated with mixed waste for which special treatability groups have been established. Therefore, this soil would be subject to the proposed soil standards rather that of the specified treatability group standards.

While the EPA position to use this process rather than the variance process is supportable, it must be noted that insufficient data exists at present to identify all potential problems that may arise in treating RMW to the proposed soil standards. This is due to the currently limited availability of both RMW characterization data and RMW treatment data. RMW characterization efforts are not yet complete, particularly for the large radioactive and RMW inventory that exists from past generation activities, and for contaminated soil and debris that will be generated in future environmental restoration activities.

Data on treatment of RMW is also limited due to the limited number of RMW treatment units currently operating. Treatment systems for RMW must be designed not only to treat the hazardous component of the RMW, but also to limit the release of radionuclides to the environment by airborne and waterborne pathways and to control contamination. These are some of the reasons that immobilization technologies are favored in most circumstances." (INEL, CS2P-00018)

Response: EPA appreciates this support of the soil treatment standards.

■ "Allowing mixed hazardous soil to be treated to proposed alternative treatment standards for hazardous soil is appropriate.

EPA proposal to subject mixed radioactive hazardous soil to the proposed alternative treatment standards for hazardous soil, rather than to the treatment standards for the contaminating hazardous waste as now required is acceptable. The treatability of hazardous constituents in mixed radioactive soil is in most cases the same as that for non-radioactive soils, and it therefore makes good sense to assign the same treatment standards to both materials." (INEL, CS2P-0018)

Response: EPA appreciates this support of the soil treatment standards. The final soil treatment standards can be applied to soil contaminated by mixed hazardous and radioactive waste.

■ "It is believed that the regulated agency should have maximum flexibility in developing treatment standards for radioactive mixed wastes (RMW). UTS may potentially limit this flexibility (i.e., subject RMW to the same UTS as nonradioactive waste) unless separate standards (similar to those being proposed for hazardous soils) are proposed for RMW. EPA should closely examine the UTS to determine whether any of the alternative treatment methods identified in the preamble would be appropriate for RMW. The soil treatment alternative entitled 'Achieving 90% Treatment with No Ceiling' would provide flexibility and may be an appropriate approach for treatment of RMW." (INEL, CS2P-

00018)

Response: EPA appreciates this support of the soil treatment standards. The final soil treatment standards can be applied to soil contaminated by mixed hazardous and radioactive waste.

- "**EPA solicits comments on subjecting mixed radioactive hazardous soil to the proposed treatment standards for hazardous soil rather than to the treatment standards for the contaminating waste. EPA also explains that this proposed approach includes soil contaminated with mixed waste for which special treatability groups have been established.**

  As indicated in preceding comments (see Section VII.C.), DOE supports the Agency's intent to establish treatment standards for hazardous soils that "are based on levels attainable by a variety of technologies, including innovative technologies." DOE believes that the regulatory scheme adopted for hazardous soils should facilitate the use of different technologies (considering the potential diversity among contaminated soils) and allow the selection of the most appropriate treatment. Although the three proposed approaches would provide a degree of flexibility relative to choosing suitable treatment methods for hazardous soils, DOE is concerned with the application of these approaches to certain RMW-contaminated soils. As discussed under section VII.C., sampling and analysis of RMW for hazardous constituents (particularly at low numerical concentrations) can be very difficult due to radiological dose considerations. Such sampling and analytical difficulties would be experience with certain RMW-contaminated soils under each of the three approaches since considerable analytical work would be required to verify compliance with the numerical standards or constituent reduction requirements.

  DOE has encouraged EPA (in response to past LDR proposals) not to limit itself to setting only concentration-based standards <u>or</u> only specified technology standards. Instead, DOE believes that the LDR regulations in many instances should accommodate both alternatives in order to allow maximum flexibility. Particularly with respect to RMW-contaminated soil, such flexibility is necessary to allow for the development of safe, appropriate treatment methods that will effectively deal with radiological and chemical components. With regard to the subject proposed rule, DOE believes the best regulatory approach would be to establish specified technology standards for hazardous soils (similar to the approach promulgated for hazardous debris) as an <u>alternative</u> to the proposed approaches. Along these same lines, DOE also believes that soils contaminated with RMW for which special treatability groups have been established should be subject to either (a) the proposed soil standards, or alternatively, (b) the existing specified treatability group standards." (DOE, CS2P-00161)

Response: EPA is not, at this time, persuaded that it should promulgate specified technologies for treatment of contaminated soil. The Agency continues to believe that the most appropriate approach for contaminated soil is to promulgate treatment standards that support a range of technologies, including common soil treatment technologies. Regarding application of the existing specified treatment standards for radioactive mixed waste to contaminated soil, like any other universal treatment standard, those standard could be applied in lieu of the soil treatment standards promulgated today.